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Addendum to Operable Unit 5 Remedial Investigation Report Fort Wainwright, Alaska

Prepared for

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DISTRIBUTION

LIST OF ACRONYMS

AAC	Alaska Administrative Code
AAI	Analytica Alaska, Inc.
ADEC	Alaska Department of Environmental Conservation
AEL	Analytica Environmental Laboratories
ARARs	Applicable or relevant and appropriate requirements
ARDL	Applied Research and Development Laboratory, Inc.
ASTM	American Society for Testing and Materials
AVGAS	Aviation gasoline
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CQAR	Chemical Quality Assurance Report
CT&E	Commercial Testing & Engineering Co., Environmental Laboratory Services
DPW	Directorate of Public Works
DRO	Diesel-range organics
EM	Electromagnetic profiling
EPA	U.S. Environmental Protection Agency
GC	Gas chromatography
GPR	Ground-penetrating radar
GRO	Gasoline-range organics
HLA	Harding Lawson Associates
IDW	Investigation-derived waste
MCL	Maximum contaminant level
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
MS	Mass spectrometry
mV	Millivolts
NPDL	North Pacific Division Laboratory
NPL	National Priorities List
OU	Operable Unit
PID	Photoionization detector
POL	Petroleum, oils, and lubricants
QFS	Quartermaster's fueling system
RBC	Risk-based concentration
RI	Remedial investigation
RRO	Residual-Range Organics
SVOC	Semivolatile organic compound
TAH	Total aromatic hydrocarbons
TAqH	Total aqueous hydrocarbons
TCA	1,1,1-trichloroethane
USACE	U.S. Army Corps of Engineers
VOC	Volatile organic compound

EXECUTIVE SUMMARY

This report presents the findings of an investigation to address data gaps identified during the Operable Unit 5 Remedial Investigation (OU 5 RI) at Fort Wainwright, Alaska. This investigation was performed by Harding Lawson Associates for the U.S. Army Corps of Engineers under Modifications 7, 8, and 9 to Delivery Order 8, under the terms of Indefinite Architect-Engineer Services Contract DACA85-94-D-0008.

This document provides supplemental information to the OU 5 RI report (HLA, 1996a) for the following three sites:

- The Drum Tar Site near the south bank of the Chena River within the West Quartermaster's Fueling System Source Area (West QFS Area).
- The site surrounding a buried fuel pipeline in the airfield south of Building 1565. This site is referred to as the Airfield Pipeline Site and is south of the East QFS Area.
- The site between Apple Street and the south bank of the Chena River surrounding a buried wood-stave pipe. This site is referred to as the Apple Street Site and is within the East QFS Area.

Tables 1 through 3 summarize the data collected at these sites during the 1995 OU 5 RI. Tables 4 through 9 present the results of this follow-up investigation. Field investigation activities were conducted from September 10, 1996, through October 3, 1996.

Sixteen shallow test pits were excavated at the Drum Tar Site to evaluate whether drums were buried at the locations of geophysical anomalies identified during the 1995 OU 5 RI. Nine drums containing tar or tar-residue were removed from the test pits. In addition, wood, metal debris, and accumulations of tar were observed in the test pits. Excavated soil/tar from the test pits contained gasoline-range organics (GRO) up to 1,020 milligrams per kilogram (mg/kg), diesel-range organics (DRO) up to 104,000 mg/kg, and residual-range organics (RRO) up to 219,000 mg/kg. Excavated drums and tar-contaminated soil were turned over to the U.S. Army Directorate of Public Works for disposal.

Nine shallow groundwater probes and two deep groundwater probes were installed at the Airfield Pipeline Site to investigate the source of dissolved petroleum hydrocarbons detected in groundwater south of Building 1565. Samples from the probes contained GRO, fuel-related volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). Concentrations of ethylbenzene exceeded the maximum contaminant level (MCL), and total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH) exceeded Alaska Drinking Water Standards. The concentrations and distribution of fuel constituents detected in the probes suggest the source is an abandoned aviation gasoline (AVGAS) pipeline running parallel to the north runway.

Six soil borings were drilled and sampled at the Apple Street Site to further investigate the extent of petroleum hydrocarbons detected in borings drilled north of Apple Street during the 1995 OU 5 RI. In addition, five bank sediment samples were collected to characterize the extent of fuel contaminants in the adjacent segment of the Chena River. The soil borings analytical results indicate fuel-contaminated soil is present from the surface to groundwater (approximately 20 feet deep) in the area surrounding a wood-stave pipe that terminates at the south bank of the Chena River. A second zone of contaminated soil is present approximately 150 feet northeast of the wood-stave pipe between 10 feet and 20 feet deep. Soil samples contained DRO up to 23,000 mg/kg and GRO up to 3,100 mg/kg. Maximum concentrations were detected at 10 feet deep. Petroleum hydrocarbon concentrations in sediment samples collected during this investigation did not exceed Alaska Department of Environmental Conservation (ADEC) cleanup levels for soil. Based on these results, the extent of petroleum hydrocarbons in sediment at this site appears limited to the immediate vicinity of Location B005 where DRO was detected at 202 mg/kg during 1995.

1.0 INTRODUCTION

This report presents the findings of an investigation to address data gaps identified during the Operable Unit 5 Remedial Investigation (OU 5 RI) at Fort Wainwright, Alaska. This investigation was performed by Harding Lawson Associates (HLA) for the U.S. Army Corps of Engineers (USACE) under Modifications 7, 8, and 9 to Delivery Order 8, under the terms of Indefinite Architect-Engineer Services Contract DACA85-94-D-0008.

Environmental assessment and remediation activities at Fort Wainwright's OU 5 are being performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 and subsequent reamendments. This investigation was implemented to address data gaps previously identified in the *Operable Unit 5, Final Remedial Investigation Report, Fort Wainwright, Alaska* (HLA, 1996a).

This document is intended to provide supplemental information to the OU 5 RI report for the following three sites:

- The Drum Tar Site near the south bank of the Chena River within the West Quartermaster's Fueling System Source Area (West QFS Area).
- The site surrounding a buried fuel pipeline in the airfield south of Building 1565. This site is referred to as the Airfield Pipeline Site and is south of the East Quartermaster's Fueling System Source Area (East QFS Area).
- The site between Apple Street and the south bank of the Chena River surrounding a buried wood-stave pipe. This site is referred to as the Apple Street Site and is within the East QFS Area.

The site locations and the OU 5 source areas are shown on Figure 1.

1.1 Objectives of the Investigation

The objectives of this investigation were to collect additional chemical and physical data from soil, sediment, and groundwater for the following reasons:

- Confirming and defining areas of contamination and types of contaminants;
- Further evaluating potential risk to human health and the environment;
- Supporting the CERCLA decision-making process for OU 5.

1.2 Drum Tar Site Background

During the 1994 North Airfield Groundwater Investigation, leaking drums of tar were observed protruding from the Chena River's south bank (HLA, 1995a). The origin of these drums may be related to the former operation of an asphalt batch plant which was located to the west near the railcar offloading facility (Figure 1). The contents of the drums were in contact with the surface water and sediments of the Chena River. Samples of tar collected in 1994 from two of the drums showed various petroleum constituents, notably diesel-range organics (DRO) up to 54,000 milligrams per kilogram (mg/kg), gasoline-range organics (GRO) up to 5,070 mg/kg, and total benzene, toluene, ethylbenzene, and xylenes (BTEX) up to 61 mg/kg. A Chena River surface-water sample collected within 10 feet of the drums contained benzene at 1.3 μg/L. It is unclear whether the benzene detected in the surface water is related to the tar.

During the 1995 OU 5 RI, several tar seeps were observed along the Chena River bank near the exposed drums (HLA, 1996a). The locations of the exposed drums and the tar seeps entering the Chena River are shown on Figure 2. The observed drums were generally corroded and at least partially crushed, with tar leaking out to the surrounding soil, sediment, or river water.

Four tar samples were collected and analyzed during the OU 5 RI. As shown on Figure 2, two samples were collected from drums and two

samples were collected from seeps that entered the Chena River. The samples were analyzed to evaluate potential environmental impacts of leachate from the seeps and/or drums.

Table 1 presents analytical results and regulatory levels for the tar samples collected during the 1995 OU 5 RI. Based on the regulatory levels presented in the table, and the benzene concentration in Sample 95FWA001TR, the contents of one of the drums was classified as hazardous waste. Observations by field personnel indicated the contents of this drum consisted of an oily substance, significantly less viscous than the tar material observed in other drums. As noted on Figure 2, this drum was subsequently removed and disposed by U.S. Army Directorate of Public Works (DPW) personnel. Based on results for Sample 95FWA002TR (Table 1), leachate from one of the tar seeps has the potential to cause localized contamination of soil, sediment, surface water, and groundwater.

Geophysical surveys were conducted during the OU 5 RI along the Chena River bank near the visible tar drums (HLA, 1996a). The purpose of the surveys was to evaluate the location and extent of possible buried drums. Geophysical instruments included a ground-penetrating radar (GPR), an electromagnetic terrain conductivity system (EM), an M-scope electromagnetic system, and a buried pipe and cable locator. Seventeen anomalies (locations A through P and an unnamed anomaly near Test Pit L) were identified within the area of the surveys. Anomaly locations, their approximate areal extent, and EM in-phase signal response levels are shown on Figure 2.

The two most significant anomalies occurred at geophysical anomaly locations A and C. EM survey in-phase signal levels were in excess of 2,500 millivolts (mV), indicating relatively large amounts of buried metal, such as a drum disposal area. Significant localized anomalies were also recorded at the six locations B, F, H, I, K, and L. These anomalies exhibited in-phase signal levels between 500 and 1,000 mV. These anomalies were attributed to moderate amounts of buried metal, such as small clusters of buried drums.

The remaining eight anomalies all exhibited in-phase signal levels less than 500 mV, suggesting localized features such as small diameter (3- to 5-foot) trenches, pits containing small amounts of metal debris, or individual drums. Based on GPR survey results, the top of each anomaly was estimated to be less than 2 feet below ground surface (bgs).

1.3 Airfield Pipeline Site Background

Soil and groundwater conditions near the Airfield Pipeline Site have been investigated during several previous studies, including:

- The 1989 and 1992 North Point Petroleum, Oils, and Lubricants (POL) Investigations by the USACE (1990 and 1992a, b, c);
- The 1993 Hangar 1 Investigation by the USACE (1993a, b);
- The 1993 Phase II Site Investigation at Building 1565 (HLA, 1994);
- The OU 5 RI (HLA, 1996a).

Each of these investigations included groundwater sampling in, or hydraulically downgradient of the Airfield Pipeline Site. A summary of pertinent results from these investigations is presented below.

North Point POL Investigation

In August 1989, the USACE drilled soil borings southwest of Building 1565. Borings AP-5558, AP-5559, and AP-5562 (Figure 3) were completed as monitoring wells. This study, described in a 1990 memorandum (USACE, 1990), identified impacts to both soil and groundwater. Results of the investigation showed petroleum hydrocarbons in soil (up to 190 mg/kg in AP-5559), and petroleum hydrocarbons and chlorinated solvents in groundwater (up to 720 µg/L DRO, and 1,100 µg/L 1,1,1-trichloroethane [TCA] in AP-5558; and 1,591 µg/L total BTEX in AP-5559).

Further sampling and analyses by the USACE at the site in January and June 1992 confirmed that these contaminants and other fuel and solvent constituents were present in soil and groundwater near Building 1565 (USACE, 1992a, b, c).

Table 1. 1995 OU 5 RI Analytical Results for the Drum Tar Site

Analyte	Method	Units	Regulatory Level[c]	Source	Drum	Seep	Seep	Drum	Drum
				Sample Number[a]	95FWA001TR	95FWA002TR	95FWA003TR	95FWA004TR	95FWA005TR
				Sample Type	PR	PR	PR	PR	QC
				Associated Duplicate Sample				95FWA005TR	95FWA004TR
Diesel-Range Organics	3550/8100M[b]	mg/kg	NA		257,000	126,000	8,500	108,000	124,000
Gasoline-Range Organics	5030/8015M[b]	mg/kg	NA		13,500	1,180	250	8.7	6.2
TCLP/VOCs									
Benzene	1311/8260	µg/L	500		1,450	14.2	ND(5)	ND(5)	ND(5)
TCLP/SVOCs									
4-Methylphenol (p-cresol)	1311/8270	µg/L	200,000		403	5.4 J	ND(10)	ND(10)	ND(10)

µg/L Micrograms per liter
mg/kg Milligrams per kilogram
NA Not applicable
ND Not detected at or above the method detection limit shown in parentheses
OU Operable unit
PR Project sample
QC Quality control sample
RI Remedial investigation
SVOCs Semivolatile organic compounds
TCLP Toxicity Characteristic Leaching Procedure
VOCs Volatile organic compounds

a. Sample locations are shown on Figure 2.
b. Alaska Department of Environmental Conservation modification.
c. Toxicity characteristic regulatory level established by 55 Federal Regulation 26986, dated June 29, 1990

Qualifiers

J Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.

Hangar 1 Investigation

The area around Building 1578, about 300 feet southwest of Building 1565, was investigated in January 1993 by the USACE (1993a, b). Six soil borings were drilled; one boring (AP-5863) was completed as a monitoring well (Figure 3). Heavy hydrocarbons, quantitated as bunker oil, were identified in soil from each boring; the highest concentration was 760 mg/kg, detected in a sample from 3.5 to 5 feet bgs in Boring AP-5862. Results of groundwater sampling indicated that hydrocarbons (68 µg/L as diesel) and cis-1,2-dichloroethene (at concentrations below maximum contaminant levels [MCLs]) were present in groundwater.

Phase II Site Investigation, Building 1565

HLA installed Monitoring Wells AP-6181, AP-6182, and AP-6185 in the area south of Building 1565 in 1993 (Figure 3). Benzene was detected at less than the 5 µg/L MCL in AP-6181 (2.3 µg/L) and was not detected in AP-6182 or AP-6185. 1,1,1-TCA was detected in AP-6182 at 24 µg/L, below the 200 µg/L MCL. Also, 15 hydropunch groundwater samples were collected in the area south of Building 1565. Benzene was detected above the MCL in one hydropunch sample (7.3 µg/L in FS-2) and total aromatic hydrocarbon (TAH) concentrations were detected above the Alaska Water Quality Standard (AWQS) of 10 µg/L in three hydropunch samples (10.6 µg/L in FS-2, 131.9 µg/L in FS-3, and 1,165 µg/L in FS-19).

OU 5 RI

During the 1995 OU 5 RI, benzene, TAH, and total aqueous hydrocarbons (TAqH) were detected at concentrations above chemical-specific applicable or relevant and appropriate requirements (ARARs) in groundwater south of Building 1565. Samples were collected from Monitoring Well AP-6181 and Groundwater Probes DP-24, DP-36, and DP-37. The analytical results for these locations are summarized in Table 2. The highest detected concentrations of benzene, DRO, GRO, TAH, and TAqH are as follows:

- Benzene up to 36.56 µg/L in DP-24 at 30 feet bgs;
- GRO up to 201 µg/L and DRO up to 139 µg/L in AP-6181 at approximately 18 ft bgs;
- TAH up to 1,158 µg/L in DP-24 at 30 feet bgs and TAqH up to 54.3 µg/L in DP-24 at 40 feet bgs.

The interpreted distribution of the contaminants suggested that the source was hydraulically upgradient, in the direction of the airfield (Figure 3). The suspected source was two abandoned fuel lines oriented parallel to the runways approximately 550 feet south of Building 1565 between the taxiway and the north runway. The 8-inch-diameter aviation gasoline (AVGAS) lines served refueling hydrants to the east and were reportedly taken out of service in the 1950's (Malen, 1997). The lines are buried approximately 5 feet bgs.

1.4 Apple Street Site Background

Petroleum hydrocarbon concentrations exceeding the Alaska Department of Environmental Conservation (ADEC) underground storage tank (UST) cleanup levels were detected in soil samples collected from Borings AP-7067 and AP-7070 during the OU 5 RI (HLA, 1996a). The borings were between Apple Street and the Chena River (Figure 4). Contaminants were detected in soil samples collected near the water table, which fluctuates seasonally between about 10 to 15 feet bgs. The maximum concentrations of DRO (10,600 mg/kg) and GRO (5,900 mg/kg) were detected in Boring AP-7070 at 10 feet bgs. A summary of soil sample analytical results is presented in Table 3.

DRO was also detected at 202 mg/kg in a sediment sample collected from Station B005 on the south bank of the Chena River (Figure 4). A suspected source of the petroleum hydrocarbons in the soil and sediment was a wood-stave sewer line that outfalls to the Chena River (Figure 4).

Table 2. 1995 OU 5 RI Summary of Groundwater Analytical Results for the Airfield Pipeline Site

				Sample Location	AP-6181	DP-24	DP-24	DP-24	DP-24	DP-24	DP-24	DP-36	DP-36	DP-36	DP-36
				Sample Number	95FWB111WA	95FWB095FA	95FWB096FA	95FWB097FA	95FWB098FA	95FWB023WA	95FWB099FA	95FWB131FA	95FWB132FA	95FWB133FA	95FWB134FA
				Sample Depth (feet)	18	20	30	40	40	40	50	20	30	40	50
				Collection Date	9/7/95	8/19/95	8/24/95	8/24/95	8/24/95	8/24/95	8/24/95	8/30/95	8/30/95	8/31/95	8/31/95
				Sample Type	PR	FS	FS	FS	FSQC	FSC	FS	FS	FS	FS	FS
	Potential ARARs														
Analyte	MCL	RBC	AWQS	Units											
Gasoline-Range Organics (C_6 - C_{10})	-	-	-	µg/L	201	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel-Range Organics (C_{10} - C_{28})	-	-	-	µg/L	139 DA, AK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Aromatic Hydrocarbons[a]	-	-	10	µg/L	**18.6**	ND(4.0)	**1,158**	**102**	**103**	**53**	**14**	**41.2**	**27**	ND(4.0)	ND(4.0)
Total Aqueous Hydrocarbons[a]	-	-	15	µg/L	**18.6**	NA	NA	NA	NA	**54**	NA	NA	NA	NA	NA
Volatile Organic Compounds															
Benzene	5	0.36[a]	-	µg/L	0.4 J	ND(1.0)	**36.56**	**5.06**	4.96	ND(0.5)	1	**22.45**	**12.19**	ND(1.0)	ND(1.0)
Ethylbenzene	700	1,300[b]	-	µg/L	**4.7**	ND(1.0)	71.86	8.51	8.7	7.3	ND(1.0)	4.4	2.83	ND(1.0)	ND(1.0)
Toluene	1,000	750[b]	-	µg/L	ND(0.5)	ND(1.0)	66.07	55.31	51.67	ND(0.5)	9.87	8.87	9.03	ND(1.0)	ND(1.0)
Xylenes	10,000	12,000	-	µg/L	13	ND(1.0)	984	33.52	37.84	45	2.59	5.39	3.61	ND(2.0)	ND(2.0)

				Sample Location	DP-36	DP-36	DP-36	DP-37	DP-37	DP-37	DP-37	DP-37	DP-37	DP-37	DP-37
				Sample Number	95FWB135FA	95FWB136FA	95FWB041WA	95FWB137FA	95FWB138FA	95FWB139FA	95FWB140FA	95FWB141FA	95FWB142FA	95FWB143FA	
				Sample Depth (feet)	60	70	70	20	30	40	50	60	70	70	
				Collection Date	8/31/95	8/31/95	8/31/95	8/30/95	8/30/95	830/95	8/30/95	8/30/95	8/30/95	8/30/95	
				Sample Type	FS	FS	FSC	FS	FS	FS	FS	FS	FS	FSQC	
	Potential ARARs														
Analyte	MCL	RBC	AWQS	Units											
Gasoline-Range Organics (C_6 - C_{10})	-	-	-	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Diesel-Range Organics (C_{10} - C_{28})	-	-	-	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Total Aromatic Hydrocarbons[a]	-	-	10	µg/L	ND(4.0)	**10.67**	1.9	5.49	**10.3**	8.4	7.91	5.38	5.92	6.19	
Total Aqueous Hydrocarbons[a]	-	-	15	µg/L	NA	NA	1.9	NA	NA	NA	NA	NA	NA	NA	
Volatile Organic Compounds															
Benzene	5	0.36[b]	-	µg/L	ND(1.0)	**4.15**	0.4	1.49	**6.17**	4.2	3.91	1.38	ND(1.0)	ND(1.0)	
Ethylbenzene	700	1,300[c]	-	µg/L	ND(1.0)	ND(1.0)	ND(0.5)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Toluene	1,000	750[c]	-	µg/L	ND(1.0)	ND(1.0)	ND(0.5)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Xylenes	10,000	12,000	-	µg/L	ND(2.0)	**4.52**	ND(0.5)	ND(2.0)	2.1	2.15	ND(2.0)	ND(2.0)	2.92	3.19	

- Applicable regulatory criteria not available
ARAR Applicable or relevant and appropriate requirement
AWQS Alaska Water Quality Standards (18 AAC 70)
FS Field screening sample
FSC Definitive confirmation sample
FSQC Field screening quality control sample
MCL Maximum Contaminant Level
NA Not analyzed
µg/L Micrograms per liter
ND Not detected at or above the method reporting limit in parentheses
OU Operable unit
PR Project sample
RBC Risk-based concentration (EPA, Region III, 1995)
RI Release investigation

a. Total aromatic hydrocarbons and total aqueous hydrocarbons were calculated with the available data and on the basis of the procedures outlined in the Alaska Department of Environmental Conservation Water Quality Standards (18 AAC 70).
b. Risk-based concentration is 10^{-6} (EPA, Region III, 1995).
c. Hazard quotient is equal to 1 (EPA, Region III, 1995).

Qualifiers

AK Lighter hydrocarbon than diesel
DA Non-fuel components excluded from the results calculation
J Estimated value

Note: Bold face numbers indicate concentrations above the potential ARAR.

Table 3. 1995 OU 5 RI Soil Sampling Analytical Results for the Apple Street Site

	Sample Location	AP-7067	AP-7067	AP-7067	AP-7067	AP-7067	AP-7070	AP-7070	AP-7070
	Sample Number	95FWB217SL	95FWB218SL	95FWB219SL	95FWB222SL	95FWB220SL	95FWB221SL	95FWB226SL	95FWB227SL	95FWB228SL
	Sample Depth (feet)	0.5	5	10	10	15	20	0.5	5	10
	Collection Date	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95
	Sample Type	PR	PR	PR	QC	PR	PR	PR	PR	PR
Analyte	Potential ARAR	Units								
Gasoline-Range Organics (C_6 - C_{10})	100[a]	mg/kg	ND(5)	ND(5)	ND(10) CM	ND(5)	ND(10) CM	ND(5)	ND(5)	ND(5)	**5,900 AW, DG, CL, AS**
Diesel-Range Organics (C_{10} - C_{28})	50[a]	mg/kg	45 AJ	24 AJ	**122 AJ,CM**	**144 AJ,CM**	90 AJ,CM	14 AJ	20 AJ	42 AJ	**10,600 AK**
Total BTEX	10,000[a]	µg/kg	ND(5)	ND(5)	5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)	5,000
Volatile Organic Compounds											
1,2,3-Trichlorobenzene	-	µg/kg	ND(20)	ND(20)	ND(40) CM	6 CM, J,B	ND(20)	ND(20)	ND(20)	ND(20)	ND(6,000) DF, DG
1,2,4-Trichlorobenzene	780,000[b]	µg/kg	ND(20)	ND(20)	ND(40) CM	5 CM, J,B	ND(20)	ND(20)	ND(20)	ND(20)	ND(6,000) DF, DG
1,2,4-Trimethylbenzene	3,900,000[b]	µg/kg	ND(20)	ND(20)	ND(40) CM	3 CM, J, B	ND(20)	ND(20)	ND(20)	ND(20)	140,000 DF, DG, CL, D, B, J
1,3,5-Trimethylbenzene	3,900,000[b]	µg/kg	ND(20)	ND(20)	ND(40) CM	ND(40) CM	ND(20)	ND(20)	ND(20)	ND(20)	50,000 DF,DG, J
1,4-Dichlorobenzene	27,000[c]	µg/kg	ND(5)	ND(5)	ND(10) CM	2 CM, J	ND(5)	ND(5)	ND(5)	ND(5)	ND(1,500) DF, DG
2-Butanone	47,000,000[b]	µg/kg	ND(20)	ND(20)	200 CM, B	120 CM, B	10 J, B	ND(20)	ND(20)	ND(20)	ND(6,000) DF, DG
Acetone	7,800,000[b]	µg/kg	ND(50)	ND(50)	810 CM	520 CM	68	ND(50)	ND(50)	ND(50)	ND(15,000) DF, DG
Hexachlorobutadiene	8,200[c]	µg/kg	ND(20)	ND(20)	ND(40) CM	5 CM, J, B	ND(20)	ND(20)	ND(20)	ND(20)	ND(6,000) DF, DG
Isopropylbenzene	3,100,000[b]	µg/kg	ND(20)	ND(20)	ND(40) CM	ND(40) CM	ND(20)	ND(20)	ND(20)	ND(20)	1,000 DF,DG, J
Methylene chloride	85,000[c]	µg/kg	4 J,B	ND(10)	ND(20) CM	ND(20) CM	ND(10)	ND(10)	ND(10)	4 J,B	ND(3,000) DF, DG
n-Butylbenzene	-	µg/kg	ND(20)	ND(20)	ND(40) CM	2 CM, J, B	ND(20)	ND(20)	ND(20)	ND(20)	12,000 DF,DG, B, J
n-Propylbenzene	-	µg/kg	ND(20)	ND(20)	ND(40) CM	1 CM, J	ND(20)	ND(20)	ND(20)	ND(20)	3,000 DF,DG, J
Naphthalene	3,100,000[b]	µg/kg	ND(20)	ND(20)	ND(40) CM	7 CM, J,B	ND(20)	ND(20)	ND(20)	ND(20)	10,000 DF,DG, B, J
p-Isopropyltoluene	-	µg/kg	ND(20)	ND(20)	8 CM, J	5 CM, J	6 J,	10 J	ND(20)	ND(20)	25,000 DF,DG, J
sec-Butylbenzene	780,000[b]	µg/kg	ND(20)	ND(20)	ND(40) CM	1 CM, J	ND(20)	ND(20)	ND(20)	ND(20)	9,700 DF, DG, J
Tetrachloroethene	12,000[c]	µg/kg	ND(5)	ND(5)	ND(10) CM	ND(10) CM	ND(5)	ND(5)	ND(5)	0.9 J	ND(1,500) DF, DG
Toluene	16,000,000[b]	µg/kg	ND(5)	ND(5)	5 CM, J	ND(10) CM	ND(5)	ND(5)	ND(5)	ND(5)	2,500 DF,DG, J
Xylenes	160,000,000[b]	µg/kg	ND(5)	ND(5)	ND(10) CM	ND(10) CM	ND(5)	ND(5)	ND(5)	ND(5)	2,500 DF,DG, J
Semivolatile Organic Compounds											
1,2,4-Trichlorobenzene	780[b]	mg/kg	ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG, J
1,4-Dichlorobenzene	27[c]	mg/kg	ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG, J
2,4-Dinitrotoluene	160[b]	mg/kg	ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG
2-Chlorophenol	390[b]	mg/kg	ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG
4-Chloro-3-methyl phenol	-	mg/kg	ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG
4-Nitrophenol	4,800[b]	mg/kg	ND(2)	ND(2)	ND(7) DG, CM	ND(7) DG, CM	ND(7)	ND(2)	ND(2)	ND(2)	ND(200) DG
Acenaphthene	4,700[b]	mg/kg	ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG
Benzo(b)fluoranthene	0.88[c]	mg/kg	0.05 J	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG, J

Table 3. 1995 OU 5 RI Soil Sampling Analytical Results for the Apple Street Site

(continued)

			Sample Location	AP-7067	AP-7067	AP-7067	AP-7067	AP-7067	AP-7067	AP-7070	AP-7070	AP-7070
			Sample Number	95FWB217SL	95FWB218SL	95FWB219SL	95FWB222SL	95FWB220SL	95FWB221SL	95FWB226SL	95FWB227SL	95FWB228SL
			Sample Depth (feet)	0.5	5	10	10	15	20	0.5	5	10
			Collection Date	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95	8/27/95
			Sample Type	PR	PR	PR	QC	PR	PR	PR	PR	PR
Bis(2-ethylhexyl) phthalate	46[c]	mg/kg		0.06 J,B	0.06 J,B	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	0.06 J,B	ND(0.3)	ND(30) DG, J
Hexachlorobutadiene	8.2[c]	mg/kg		ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG, J
N-Nitrosodi-n-propylamine	0.091[c]	mg/kg		ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG
Naphthalene	3,100[b]	mg/kg		ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	12 DG, J
Pentachlorophenol	5.3[c]	mg/kg		ND(2)	ND(2)	ND(7) DG, CM	ND(7) DG, CM	ND(7)	ND(2)	ND(2)	ND(2)	ND(200) DG, J
Phenol	47,000[b]	mg/kg		ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG
Pyrene	2,300[b]	mg/kg		ND(0.3)	ND(0.3)	ND(1.1) DG, CM	ND(1.1) DG, CM	ND(1)	ND(0.3)	ND(0.3)	ND(0.3)	ND(30) DG, J

- Applicable regulatory criteria not available
BTEX Total benzene, toluene, ethylbenzene, and xylenes
ARAR Applicable or relevant and appropriate requirement
BTEX Total benzene, toluene, ethylbenzene, and xylenes
µg/kg Micrograms per kilogram
mg/kg Milligrams per kilogram
ND Not detected at or above the method reporting limit in parentheses
OU Operable unit
PR Project Sample
QC Quality control duplicate sample
RI Release investigation

a. Alaska Department of Environmental Conservation, 1995, and Title 18, Alaska Administrative Code, Chapter 78, Underground Storage Tanks, as amended through November 3, 1995.
b. Hazard quotient is equal to 1 (U.S. Environmental Protection Agency [EPA], Region III, 1995).
c. Risk based concentration level is 10^{-6} (EPA, Region III, 1995).

Qualifiers

AJ Heavier hydrocarbon than diesel
AK Lighter hydrocarbon than diesel
AS Heavier hydrocarbon than diesel
AW Detection limit increased due to dilution factor
B Analyte present in the blank and the sample
CL Initial analysis within holding time but required dilution
CM Reporting limits elevated due to low percent solids
D Analytes analyzed at a secondary dilution
DF Reporting limit elevated due to matrix interference
DG Reporting limit elevated due to sample dilution
J Estimated Value

Note: Bold face numbers indicate concentrations above the potential ARAR.

2.0 FIELD INVESTIGATION

Field operations in support of this investigation were performed in accordance with HLA's OU 5 *Remedial Investigation/Feasibility Study Management Plan* (1995b), the *Magnetic Anomaly Test Pit Investigation Work Plan* (HLA, 1996b), and the *Magnetic Anomaly Test Pit Investigation Site Safety and Health Plan* (HLA, 1996c).

2.1 Scope of the Field Investigation

HLA's scope of work for the field investigation was outlined under Delivery Order 8, Modifications 7 through 9. Modification 7 included the following field investigation tasks:

- Excavating test pits adjacent to magnetic anomaly locations A through P identified during the OU 5 RI (Figure 2);
- Sampling stockpiled soil from the excavations and analyzing the soil for aromatic volatile organics (AVO), GRO, and DRO;
- Removing, overpacking, and properly disposing of any drums revealed during excavation;
- Properly disposing of investigation-derived waste (IDW) soil and water;
- Backfilling and regrading the test pit excavations.

Modification 8 included the following field investigation tasks:

- Installing and sampling nine shallow groundwater probes and two deep groundwater probes in the area southeast of Building 1565;
- Drilling and sampling six soil borings near the wood-stave pipe along the bank of the Chena River;
- Collecting five bank-sediment samples near the wood-stave pipe outfall to the Chena River
- Properly disposing of IDW soil and water.

Modification 9 consisted of the following:

- Additional sampling of stockpiled soil from the test pit excavations for analysis of residual-range organics (RRO).

2.2 Field Investigation Schedule

The field investigation was conducted from September 10, 1996, through October 3, 1996. Test pit excavations at the Drum Tar Site were conducted from September 16 through 20, 1996. Groundwater probe installation and sampling at the Airfield Pipeline Site began on September 22, 1996, and was completed on October 3, 1996. Drilling and soil sampling at the Apple Street Site was conducted from September 23 to 25, 1996. Sediment sampling at the Apple Street Site was performed on September 28, 1996. Surveying of probe, boring, and sediment sampling points was completed in September 1996, by FPE/ROEN Engineers, Inc.

2.3 Investigation Methods

The following sections detail field procedures and approaches used during the investigations.

2.3.1 Utility Clearance

The presence of utilities and other subsurface obstructions at test pit, boring, and probe locations was established before initiating subsurface investigations. Fort Wainwright utility personnel were notified of the proposed investigation locations and were requested to provide clearance. In addition, geophysical instruments (as described below) were used to identify potential subsurface obstructions.

2.3.2 Geophysical Surveys

A surface geophysical survey was conducted at all new groundwater probe and soil boring locations, and along the south bank of the Chena River at the Drum Tar Site. The purpose of the surveys was to clear boring/probe locations for buried utilities or other obstructions, and to confirm locations of magnetic anomalies previously identified. Geophysical instruments included a GPR, an EM,

and a buried pipe and cable locator. The following general geophysical procedures were used:

- Performed a functional check of equipment and calibrated to local site conditions;
- Established a grid of perpendicular survey transects over the investigation area;
- Investigated subsurface conditions along the survey transects using GPR, EM, and/or the buried pipe and cable locator;
- Recorded pertinent information in a field notebook.

2.3.3 Test Pit Excavation and Logging Procedures

Test pits were excavated at the Drum Tar Site to log subsurface conditions and remove buried drums or metal debris. A log of conditions encountered during excavation was maintained by the field superintendent. Test pit logs are presented in Appendix A. The logs were prepared in accordance with the American Society for Testing and Materials (ASTM) Methods D 2487-93 and D 2488-93.

Test pits were excavated by Wagner Excavation with a Case 580D backhoe, under the direction of HLA's field superintendent. The locations of the anomalies where test pit excavations occurred are presented on Figure 2. Test pits were excavated to a maximum of 4 feet bgs.

A field-screening sample was collected from the center of each backhoe bucket load of soil for a headspace reading using a photoionization detector (PID). PID screening procedures are detailed in HLA's *Magnetic Anomaly Test Pit Investigation Work Plan* (1996b). Soil with a headspace reading below 10 parts per million (ppm) and not visibly impacted by tar was placed in a "clean" soil stockpile for later use as backfill. Soil with a headspace reading greater than 10 ppm was placed in a contaminated soil stockpile, sampled, containerized in 55-gallon drums, and was turned over to Mr. Bob Grey. Decontamination procedures used for the backhoe bucket are described in section 2.2.8. IDW disposal is discussed in section 2.2.9.

Several PID headspace measurements were collected at random locations in each contaminated soil stockpile. One laboratory sample was collected from each contaminated soil stockpile from the screening location with the highest PID reading, or from an area of stained soil. GRO and AVO sample fractions were collected before other sample fractions to minimize the loss of volatiles.

Excavations were backfilled with imported granular fill and native soil from the clean stockpiles. The backfill at each test pit location was mounded to allow for future settlement and promote positive drainage.

2.3.4 Drum Removal

In test pits where drums were uncovered, the backhoe operator removed the drums with a chain hoist extending from the backhoe bucket. The tar drums were placed directly into metal overpack drums. A detailed description of the buried drums and debris uncovered during test pit excavation is presented in section 4. IDW disposal is discussed in section 2.2.9.

2.3.5 Groundwater Probe Investigation

Nine groundwater probes (PS-4 through PS-12) were installed and sampled at the Airfield Pipeline Site to further define the lateral and vertical extents of dissolved groundwater contaminants (Figure 5). Groundwater probes were installed using a mobile impact hammer. The probes consisted of nominal 1/2-inch-diameter, Schedule 40, black iron pipe with a stainless steel drive point, and a 2-foot length of stainless steel 0.008-inch vertically slotted screen. A 3-foot section of blank stainless steel was attached to the bottom of the screened section to trap silt. Blank sections of pipe were welded together to achieve desired depths.

The nine shallow probes were initially installed with the center of the screen approximately 20 feet bgs. Two of the shallow probes were then converted to deep probes by advancing the probe in 10-foot increments to approximately 70 feet bgs.

Before purging or sampling, the depth to water from the top of the probe, and the length of probe above the ground surface, were measured using an electronic sounder with a cable permanently marked in 0.01-inch increments. These measurements and the total length of the probe were recorded on the Groundwater Probe Sampling form presented in Appendix B.

Groundwater-probe purging and sampling was accomplished using an inertial pump consisting of 3/8-inch-diameter high density polyethylene (HDPE) tubing equipped with a foot valve. New tubing and foot valves were used for each sample. The intake end of the sample tubing was placed at approximately the middle of the submerged screen section. After a minimum of 20 probe volumes were purged, samples were collected to measure the field parameters pH, conductivity, temperature, dissolved oxygen (DO), oxidation-reduction potential, and turbidity. The field parameters are recorded on the Groundwater Probe Sampling Form presented in Appendix B. If the turbidity was greater than 200 nephelometric turbidity units (NTUs), an additional 10 probe volumes were purged, and the sample was collected.

Purge and decontamination water were collected and delivered to the Fort Wainwright IDW treatment area at Building 1595 for granular activated carbon treatment and discharge.

The groundwater probes were installed and sampled in two phases; sample results from Phase I (4 shallow probes and 1 deep probe) were used to select locations for Phase II (3 shallow probes and 1 deep probe). Phase I probes included PS-4 (deep probe); and PS-5, -6, -7, and -8 (shallow probes). Phase II probes included PS-11 (deep probe); and PS-9, -10, and -12 (shallow probes). Samples from Phases I and II were analyzed for GRO and AVOs on a 24-hour-turnaround basis.

Five probes (PS-5, -7, -9, -10, and -12) were selected for additional sampling based on the Phases I and II analytical results. The samples were analyzed for GRO (EPA Method 8015M), DRO (EPA Method 8100M), volatile organic compounds (VOCs) (EPA Method 8260), and semivolatile organic compounds (SVOCs) (EPA Method 8270).

Following sample collection, all probes were removed, and the formation allowed to collapse.

2.3.6 Soil Boring Investigation

Six soil borings (AP-7245 through AP-7250) were drilled at the Apple Street Site (Figure 6) to investigate subsurface conditions and collect soil samples. A log of conditions encountered during drilling was maintained by HLA's field technician supervising the operation. Soil boring logs and associated laboratory geotechnical data generated during the investigation are presented in Appendix C. Boring logs were prepared in accordance with ASTM Methods D 2487-93 and D 2488-93. Appendix C, Figures C-1 through C-3 present a key to sampling and testing data, the soil classification system, and the USACE soil frost classification system, respectively.

Borings were drilled with a truck-mounted B-61 drilling rig equipped with hollow-stem augers. Samples were collected from borings with a 4.5-inch outside diameter split-barrel sampler for soil description and chemical and geotechnical analyses. Typically, two samples from each boring were collected for geotechnical analyses. Soil samples submitted for chemical analyses were typically collected at 5, 10, 15, and 20 feet bgs. Sample fractions for laboratory analyses of VOCs and GRO were retrieved from the split-barrel sampler first to minimize aeration, and were tightly packed in the jars, leaving no headspace. Following descriptive logging, the remaining sample was homogenized in a stainless steel bowl and placed in the remaining sample containers. Each sample was field-screened for organic vapors by filling a recloseable plastic bag approximately 1/3 full, placing the bag in a warm area for 10 to 15 minutes, inserting the probe of a PID into the headspace of the bag, and recording the highest PID

reading on the boring log. Observations made during sampling, such as odor or sheen, were also recorded on the boring log. Sampling equipment was decontaminated between sampling locations following procedures described in section 2.2.8.

2.3.7 Sediment Investigation

Sediment samples were collected from five locations (B028 through B032) along the south bank of the Chena River at the Apple Street Site (Figure 6). The samples were collected from about 3 to 6 inches below the sediment surface, using a stainless steel hand trowel. Sample fractions for analyses of GRO and AVO were retrieved first to minimize aeration, and were tightly packed in jars, leaving no headspace. The remaining sample was homogenized in a stainless-steel bowl and placed in the remaining sample containers. Each sample was field screened for organic vapors using a PID.

2.3.8 Decontamination Procedures

Equipment coming in contact with contaminated or potentially contaminated media was decontaminated as follows:

- Drilling rig augers and rods were steam cleaned before each use;
- Split-barrel samplers were washed in a nonphosphate detergent solution; rinsed with potable water, pesticide-grade methanol, and pesticide-grade hexane; and allowed to air dry before reuse;
- Between test pits, the backhoe bucket was washed in a nonphosphate detergent solution and rinsed with potable water;
- The wetted portion of the electronic water level indicator was washed in a nonphosphate detergent solution, rinsed with potable water, then deionized water;
- Clean sample jars, containing a preservative if appropriate, were provided by the laboratories.

2.3.9 Disposition of Investigation-Derived Waste

Drill Cuttings and Contaminated Stockpile Soil

Drill cuttings from soil borings and contaminated stockpile soil from test pit excavations were stored in 55-gallon, open-top drums. The drums were labeled with a USACE-supplied CERCLA IDW Label, a control number, a brief description of the contents, the USACE contract number, and point of contact. The drums were transported to the Fort Wainwright Hazardous Materials Accumulation Point at Building 1546, and turned over to Mr. Bob Grey for temporary storage until analytical results were available to characterize the soil for disposal.

Tar Drums and Buried Debris

Tar drums and selected debris exposed during test pit excavation were placed in 55-gallon and 85-gallon overpack drums. A description of the items that were containerized is presented in section 4. The drums were labeled with a USACE-supplied CERCLA IDW Label, a control number, a brief description of the contents, the USACE contract number, and point of contact. The drums were transported to the Fort Wainwright Hazardous Materials Accumulation Point at Building 1546, and turned over to Mr. Bob Grey for disposal.

Decontamination and Development Fluids

Decontamination fluids and wastewater from development and sampling of groundwater probes were temporarily stored in 55-gallon drums. The drums were transported to the Defense Environmental Restoration Account water treatment system at Building 1546 for treatment and discharge.

2.3.10 Location Surveying

Site surveying was conducted by FPE/ROEN, Inc. to provide ground elevations and horizontal locations for soil borings, groundwater probes, and sediment samples. Elevations were measured to an accuracy of 0.01 foot, and horizontal locations were measured to an accuracy of 1.0 foot. The surveys were referenced to an existing grid system used at Fort Wainwright. Survey data generated during this investigation is presented in Appendix D.

3.0 ANALYTICAL PROGRAM

3.1 Sampling Program Structure

The project included collecting and analyzing several types of samples to be used for site characterization and data quality assessment as follows:

- Primary samples were collected and analyzed to ascertain analyte levels in the media being sampled;
- Quality control (QC) duplicate samples were collected and analyzed to evaluate intralaboratory and sampling precision;
- Quality assurance (QA) duplicate samples were collected and analyzed by the QA laboratory to evaluate the precision of the sampling and intralaboratory processes;
- Trip blanks (laboratory-supplied samples of organic-free water) accompanied each cooler shipment containing groundwater samples for AVO, VOC, and GRO analyses to evaluate cross contamination during shipment.

3.2 Analytical Laboratories

Laboratories that performed analyses during this investigation along with their respective roles are identified below.

- Primary and QC soil/tar samples collected under Modifications 7 and 9 were analyzed by Commercial Testing & Engineering, Environmental Services, Inc. (CT&E), Anchorage, Alaska;
- QA samples collected under Modifications 7 and 9 were analyzed by Applied Research and Development Laboratory (ARDL), Mt. Vernon, Illinois;
- Primary and QC soil, sediment, and groundwater samples collected under Modification 8 were analyzed by Analytica Alaska, Inc. (AAI), Anchorage, Alaska, and Analytica Environmental Laboratories (AEL), Golden, Colorado;
- QA samples collected under Modification 8 were analyzed by ARDL;
- Geotechnical samples collected under Modification 8 were analyzed by HLA's soils laboratory, Anchorage, Alaska.

The laboratories performing analyses of primary and QC samples (CT&E, AAI, and AEL) were contracted by HLA. The QA laboratory (ARDL) was contracted by the USACE North Pacific Division Laboratory (NPDL) in Troutdale, Oregon.

3.3 Analytical Approach

Media sampled during the data gaps investigation included soil, soil/tar mixtures, groundwater, and sediment. The following analytical methods were used:

- DRO was analyzed by gas chromatography (GC) using U.S. Environmental Protection Agency (EPA) Method SW-8100 modified for calibration of hydrocarbons in the range of C_{10} to C_{28};
- GRO was analyzed by GC using EPA Method SW-8015 modified for calibration of hydrocarbons in the range of C_6 to C_{10};
- AVOs were analyzed by GC/photoionization detector (PID) using EPA Method SW-8020;
- VOCs were analyzed by GC/mass spectrometry (MS) using EPA Method SW-8260;
- SVOCs were analyzed by GC/MS using EPA Method SW-8270;
- Particle size distribution was measured using ASTM Methods C 117, C 136, D 421, and D 422.

3.4 Chemical Quality Assurance

The USACE NPDL performed a chemical quality assurance review of analytical data from the laboratories. The results of the review are reported in the following chemical quality assurance reports (CQARs):

- *OU-5 Magnetic Anomaly, Test Pits, Ft. WW,* January 9, 1997 - Contains the NPDLs review of data for samples collected under Modifications 7 and 9;
- *OU-5 Data Gaps (Building 1565 and Wood Stave Pipe Inv.), Fort Wainwright,* December 31, 1996 - Contains the NPDLs review of data for samples collected under Modification 8.

Each of these CQARs describes the quality of analytical results for a selected sample medium, and provides information about the overall results from laboratory QC sample analyses. Problems experienced during sample analyses were expressed as general qualifying statements. Copies of the CQARs are included in Appendix E.

The NPDL did not apply specific EPA standard qualifiers to analytical results to document data technical utility. Consequently, HLA reviewed the CQARs, catalogued the qualifying statements, and converted these statements into qualifiers consistent with respective EPA or other validation guidelines. HLA then applied these qualifiers to affected analytical results reported in section 4 of this report.

4.0 RESULTS

This section presents analytical results for the samples collected at the Drum Tar Site, the Airfield Pipeline Site, and the Apple Street Site. Also presented for comparison are potential ARARs identified in the OU 5 RI report.

4.1 Drum Tar Site

Analytical results for samples from the stockpiled soil/tar at the Drum Tar Site are presented in Table 4. Detailed information for each of the test pit excavations including items exposed and removed or left in place during excavation are outlined in Table 5. A photo log is also provided in Appendix F.

Data from the test pits and previously drilled borings indicate the Drum Tar Site is a fill area where various debris was buried. Historical information and aerial photographs suggest the fill material (approximately 5 to 10 feet thick) was placed during the late 1940's. Buried items included railroad materials (rails, wooden ties, plates, spikes, etc.), piping and miscellaneous scrap metal, and occasional drums. A total of 9 drums containing tar or tar residue were exposed and removed during excavation activities. No areas containing multiple drums were discovered. Test Pits G, H, I, L, and M contained accumulations of buried tar that were left in place. The consistency of the tar varied from low viscosity fluid in Test Pit H to a hard solid similar to asphalt pavement in Test Pit G.

4.2 Airfield Pipeline Site

Tables 6 and 7 present results for analytes detected in samples from groundwater probes at the Airfield Pipeline Site. A complete summary of analytical results for the Airfield Pipeline Site is in Appendix G.

A comparison of the groundwater sample results with potential ARARs indicates the following:

- Ethylbenzene was detected at 760 μg/L in PS-4 at a depth of 20 feet bgs. This concentration exceeds the 700 μg/L MCL.
- TAH was detected above the potential ARAR of 10 μg/L in PS-4, -9, and -11 with the highest concentration being 5,670 μg/L in PS-4 at 20 feet bgs.
- TAqH was detected above the potential ARAR of 15 μg/L in PS-9 at 470 μg/L (20 feet bgs).

A sheen was noted in development water from Probes PS-4, PS-6, and PS-9. Figure 5 shows the inferred extent of groundwater contaminants exceeding potential ARARs as interpreted by HLA. The source of the contamination appears to be the abandoned AVGAS pipeline(s) running parallel to the north runway. Other contributing sources may also be present in the area south and east of Building 1565.

Table 4. 1996 Results for Analytes Detected in the Soil Stockpile Samples from the Drum Tar Site

	Reference	Test Pit Stockpile	G & H	I	J	N	L	M	K	K
		Sample Number	96FWA001SL	96FWA002SL	96FWA003SL	96FWA004SL	96FWA005SL	96FWA006SL	96FWA007SL	96FWA008SL
		Collection Date	9/20/96	9/20/96	9/20/96	9/20/96	9/20/96	9/20/96	9/20/96	9/20/96
	Potential ARAR	Units								
Diesel-Range Organics (C_{10} - C_{28})	100[a]	mg/kg	**14,700**	**12,100**	**12,200**	**2,610**	**104,000**	**8,870**	**2,830**	**3,730**
Gasoline-Range Organics (C_6 - C_{10})	50[a]	mg/kg	**1,020**	**238**	**2,040**	1.73	8.39	15.6	2.51	0.979
Residual-Range Organics (C_{25} - C_{45})	2,000[a]	mg/kg	14,900	18,600	21,200	8,760	21,900	26,500	6,350	8,020
Volatile Organic Compounds										
Benzene	0.1[a]	mg/kg	ND(0.244)	ND(0.51)	ND(0.306)	ND(0.0427)	ND(0.123)	ND(0.127)	0.0796	ND(0.0489)
Toluene	10[a]	mg/kg	0.269	0.128	2.55	ND(0.0427)	ND(0.123)	ND(0.127)	0.271	0.0764
Ethylbenzene	10[a]	mg/kg	0.948	0.383	5.24	ND(0.0427)	ND(0.123)	ND(0.127)	ND(0.0527)	ND(0.0489)
P & M-Xylene	10[a]	mg/kg	6.98	2.6	**21.9**	ND(0.0427)	0.171	0.253	0.168	ND(0.0489)
o-Xylene	10[a]	mg/kg	**16.1**	1.98	**11.8**	ND(0.0427)	ND(0.123)	0.311	0.0737	ND(0.0489)

ARAR Applicable or relevant and appropriate requirement
mg/kg Milligrams per kilogram
ND Not detected at or above the method reporting limit in parentheses

a. Alaska Department of Environmental Conservation, 1995, and Title 18, Alaska Administrative Code, Chapter 78, Underground Storage Tanks, as amended through November 3, 1995.

Note: Bold face numbers indicate concentrations above the potential ARAR.

Table 5. Items Exposed During 1996 Test Pit Excavation

Test Pit[a]	Item(s) Exposed During Excavation	Item(s) Left in the Excavation	Reference Photo Numbers in Appendix F	Notes
A	Several small pieces of metal debris. Large (approximately 8 x 12 feet) boiler manifold.	Several small pieces of metal debris. Large (approximately 8 x 12 feet) boiler manifold.	1 - 2	Excavated soil used as backfill.
B	2-inch thick steel plate (3 x 2 feet).[b]	None	3 - 4	Excavated soil used as backfill.
C	1/4-inch steel plate (2.5 x 2.5 feet).[b] Chunks of asphalt.	1/4-inch steel plate. Chunks of asphalt.	5 - 6	Excavated soil used as backfill.
D	6 x 10 inch metal plates, spikes, and bolts (railroad hardware)[b]	None	7 - 8	Excavated soil used as backfill.
E - F	10 foot long by 3-inch-diameter pipe (5 each).[b] Wood railroad ties. 4 x 4 foot thin metal sheet.[b]	Wood railroad ties.	9 - 10	Excavated soil used as backfill.
G	Sheet metal and metal railroad rails.[b] Asphalt/tar/aggregate mixture. Wood debris.	Asphalt/tar/aggregate mixture. Wood debris.	11-12	Excavated tar/soil placed into a 55-gallon drum.[e]
H	4-inch metal flex hose full of tar.[c] Other flex hoses without tar. [c] 1 drum 1/3 full of tar (existing hole In drum).[d] 1 empty drum with tar residue.[d]	4-inch metal flex hose.[c] Tar.	13 - 14	Low viscosity tar material remaining at the limits of the excavation.
I	3 to 4 foot long small pipe.[b] Thin tar-coated metal sheeting. Soil mixed with tar. Tar-coated bung tops for drums.[b]	Some soil mixed with tar. Thin tar-coated metal sheeting.	15 - 16	Excavated soil mixed with tar and tar-coated bung tops were placed into 55-gallon drums (7 each).[e]
J	1 drum with tar residue. Soil with tar.	None	17 - 18	Excavated soil/tar placed into 55-gallon drum.[e]

Table 5. Items Exposed During 1996 Test Pit Excavation

(continued)

Test Pit[a]	Item(s) Exposed During Excavation	Item(s) Left in or Exposed at the Excavation Limits	Reference Photo Numbers in Appendix	Notes
K	Drum with some tar.[d] Small metal debris.[b] Soil with tar.	None	19 - 20	Excavated soil/tar placed into 55-gallon drum.[e]
L	Small metal debris.[b] Drum coated with tar.[d] Soil with tar clumps.	Some soil with tar clumps.	21 - 22	Excavated soil/tar placed into 55-gallon drum.[e]
M	5 gallon metal bucket (crushed) with tar residue.[d] Soil mixed with tar.	Some soil mixed with tar.	23 - 24	Excavated soil/tar placed into 55-gallon drum.[e]
N	Drum with water/tar mixture.[d] Soil mixed with tar.	None	25 - 26	Excavated soil/tar placed into 55-gallon drum.[e]
O	Wood debris.[b] Wood stave pipe.[b] Drum with soil/tar mixture.[d] Metal pipe.[b]	None	27	Excavated soil used as backfill.
P	1 drum with tar/gravel mixture.[d]	None	28 - 30	Excavated soil used as backfill.
"Unnamed" (near test pit L)	1 drum with tar residue.[d]	None	31	Excavated soil used as backfill.

IDW Investigative derived waste.

a. Test pit logs are included in Appendix A.
b. Debris item(s) removed from test pit and disposed at Fairbanks landfill.
c. Most flex hoses were removed from the excavation, however, some hoses that were deeply buried remain.
d. Excavated tar drums were overpacked and delivered to the Army's temporary IDW storage facility at Building 3489.
e. Open-top drums used for containment of IDW soil and soil/tar mixtures were delivered to the Army's temporary IDW storage facility at Building 3489.

Table 6. 1996 Groundwater Sample Results (Quick Turnaround) for Analytes Detected at the Airfield Pipeline Site

Sample Location				PS-4	PS-4	PS-4	PS-4	PS-4	PS-5	PS-6	PS-7	PS-8	PS-9
Sample Number				96FWB001WA	96FWB006WA	96FWB007WA	96FWB009WA	96FWB012WA	96FWB002WA	96FWB003WA	96FWB004WA	96FWB005WA	96FWB016WA
Sample Depth (feet)				20	30	30	40	70	20	20	20	20	20
Date Collected				9/21/96	9/22/96	9/22/96	9/22/96	9/22/96	9/21/96	9/21/96	9/22/96	9/22/96	9/27/96
Sample Type				PR	PR	QC	PR	PR	PR	PR	PR	PR	PR
	Potential ARAR												
Analyte	MCL	RBC	AWQS	Units									
Gasoline-Range Organics (C_6 - C_{10})	-	-	-	µg/L	21,000	2,900	3,800	2,400	270	ND(100)	ND(100)	ND(100)	ND(100)	9,600
Volatile Organic Compounds														
Ethylbenzene	700	1,300[a]	-	µg/L	**760**	15	14	ND(5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	55
Toluene	1,000	750[a]	-	µg/L	290	ND(5)	6.1	ND(5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)
Xylenes	10,000	12,000[a]	-	µg/L	4,600	130	120	61	1.3	ND(1)	ND(1)	ND(1)	ND(1)	600
Total Aromatic Hydrocarbons (TAH)[b]	-	-	10	µg/L	**5,670**	**155**	**142**	**76**	4.3	ND(4)	ND(4)	ND(4)	ND(4)	**695**

Sample Location				PS-9	PS-10	PS-11	PS-11	PS-11	PS-11	PS-11	PS-11	PS-11	PS-12
Sample Number				96FWB017WA	96FWB019WA	96FWB015WA	96FWB021WA	96FWB022WA	96FWB023WA	96FWB025WA	96FWB026WA	96FWB027WA	96FWB020WA
Sample Depth (feet)				20	20	20	30	40	40	50	60	70	20
Date Collected				9/27/96	9/27/96	9/27/96	9/27/96	9/27/96	9/27/96	9/27/96	9/27/96	9/27/96	9/27/96
Sample Type				QC	PR	QC	PR	PR	QC	PR	PR	PR	PR
	Potential ARAR												
Analyte	MCL	RBC	AWQS	Units									
Gasoline-Range Organics (C_6 - C_{10})	-	-	-	µg/L	16,000	2,600	2,500	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Volatile Organic Compounds														
Ethylbenzene	700	1,300[a]	-	µg/L	89	ND(2)	**41**	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Toluene	1,000	750[a]	-	µg/L	29	ND(2)	ND(5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Xylenes	10,000	12,000[a]	-	µg/L	980	3.2	430	4.3	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Total Aromatic Hydrocarbons (TAH)[b]	-	-	10	µg/L	**1,118**	9.2	**481**	7.3	ND(4)	ND(4)	ND(4)	ND(4)	ND(4)	ND(4)

- Applicable regulatory criteria not available
ARAR Applicable or relevant and appropriate requirement
AWQS Alaska Water Quality Standards (18 AAC 70)
MCL Maximum Contaminant Level (Drinking Water Regulations and Health Advisories, EPA, 1994)
ND Not detected at or above the method reporting limit in parentheses
PR Project sample
QC Quality control
RBC Risk-based Concentration (EPA, Region 3, 1995)

a. Hazard quotient is equal to 1 (EPA, Region III, 1995).
b. TAH was calculated with the available data and on the basis of the procedures outlined in the Alaska Department of Environmental Conservation Water Quality Standards (18 AAC 70).

Note: Bold face numbers indicate concentrations above the potential ARAR.

Table 7. 1996 Confirmation Groundwater Sampling Results for Analytes Detected at the Airfield Pipeline Site

				Sample Location	PS-5	PS-7	PS-9	PS-9	PS-10	PS-12
				Sample Number	96FWB035WA	96FWB036WA	96FWB032WA	96FWB033WA	96FWB037WA	96FWB038WA
				Sample Depth (feet)	20	20	20	20	20	20
				Date Collected	10/3/96	10/3/96	10/3/96	10/3/96	10/3/96	10/3/96
				Sample Type	PR	PR	PR	QC	PR	PR
	Potential ARAR									
Analyte	MCL	RBC	AWQS	Units						
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	-	300[a]	-	µg/L	ND(5)	ND(5)	27	27	ND(5)	ND(5)
1,3,5-Trimethylbenzene	-	300[a]	-	µg/L	ND(5)	ND(5)	6.5	6.9	ND(5)	ND(5)
4-Methyl-2-pentanone	-	-	-	µg/L	ND(20)	ND(20)	81	58	ND(20)	ND(20)
Ethylbenzene	700	1300[a]		µg/L	ND(1)	ND(1)	45	45	ND(1)	ND(1)
Isopropylbenzene	-	1500[a]	-	µg/L	ND(2)	ND(2)	ND(2)	2.4	ND(2)	ND(2)
m,p-Xylene (Sum of Isomers)	-	-	-	µg/L	ND(1)	ND(1)	350	350	ND(1)	ND(1)
Naphthalene	-	1500[a]	-	µg/L	ND(5)	ND(5)	3.8 J	3.4 J	ND(5)	ND(5)
o-Xylene	-	1400[a]	-	µg/L	ND(1)	ND(1)	55	49	ND(1)	ND(1)
Toluene	1,000	750[a]	-	µg/L	ND(1)	ND(1)	3.7	3	ND(1)	ND(1)
Semivolatile Organic Compounds										
2-Methylnaphthalene	-	-	-	µg/L	ND(10)	ND(10)	ND(10)	1 J	ND(10)	ND(10)
Acenaphthene	-	2,200[a]	-	µg/L	ND(10)	ND(10)	2.2 J	2.4 J	ND(10)	ND(10)
Benzyl butyl phthalate	-	7,300[a]	-	µg/L	1.4 J, B	1 J, B	2.9 J, B	1.9 J, B	3.1 J, B	1.3 J, B
Di-n-butyl phthalate	-	4,000[a]	-	µg/L	ND(10)	ND(10)	1.7 J, B	ND(10)	1.2 J, B	ND(10)
Fluoranthene	-	1,500[a]	-	µg/L	ND(10)	ND(10)	1.5 J	2.3 J	ND(10)	ND(10)
Fluorene	-	1,500[a]	-	µg/L	ND(10)	ND(10)	1.5 J	1.7 J	ND(10)	ND(10)
Naphthalene	-	1,500[a]	-	µg/L	ND(10)	ND(10)	2 J	2.6 J	ND(10)	ND(10)
Phenanthrene	-	-	-	µg/L	ND(10)	ND(10)	3.9 J	4.6 J	ND(10)	ND(10)
Pyrene	-	1,000[a]	-	µg/L	ND(10)	ND(10)	1.5 J	2.2 J	ND(10)	ND(10)
Total Aromatic Hydrocarbons[b]	-	-	10	µg/L	5	5	**454**	**448**	5	5
Total Aqueous Hydrocarbons[b]	-	-	15	µg/L	5	5	**470**	**465**	5	5

\- Applicable regulatory criteria not available
ARAR Applicable or relevant and appropriate requirement
AWQS Alaska Water Quality Standards (18 AAC 70)
MCL Maximum contaminant Level (Drinking Water Regulations and Health Advisories, EPA, 1994)
ND Not detected at or above the method detection limit in parentheses
RBC Risk-based Concentration (EPA Region 3, 1995)

Note: Bold face numbers indicate concentrations above the potential ARAR.

a. Hazard quotient is equal to 1 (EPA, 1995).
b. TAH and TAqH were calculated with the available data and on the basis of the procedures outlined in the Alaska Department of Environmental Conservation Water Quality Standards (18 AAC 70)

Qualifiers

B Analyte detected in the blank and the sample
J Estimated value

4.3 Apple Street Site

The investigation at the Apple Street Site included drilling and sampling 6 soil borings and collecting 5 bank-sediment samples. The analytes detected in the soil and sediment samples are presented in Tables 8 and 9, respectively. A complete summary of analytical results for the Apple Street Site is located in Appendix G.

DRO was detected in samples from each of the six borings at concentrations exceeding the 100 mg/kg potential ARAR. The concentrations of GRO exceeded the 50 mg/kg potential ARAR in Borings AP-7245, AP-7246, and AP-7249. The maximum concentrations of GRO (3,100 mg/kg) and DRO (23,000 mg/kg) were detected at 10 feet bgs in Borings AP-7245 and AP-7246, respectively. The distribution of contaminants suggests a subsurface release centered around the vicinity of the wood-stave pipe. Figure 6 illustrates the inferred extent of contamination at 10, 15, and 20 feet bgs based on the above results and historical data from AP-7067 and AP-7070.

Analytical results for the Chena River bank sediment samples collected from Stations B028 through B032 indicate DRO concentrations ranging from 29 to 51 mg/kg. On the basis of these results and the OU 5 RI results, the extent of DRO in sediment in excess of 100 mg/kg appears to be limited to the area near Station B005 (Figure 6), where DRO was detected at 202 mg/kg during the OU 5 RI.

5.0 DISCUSSION AND RECOMMENDATIONS

This section presents discussion and recommendations for the Drum Tar Site, Airfield Pipeline Site, and Apple Street Site based the results presented in section 4 and the historical data provided in section 1 of this report.

5.1 Drum Tar Site

Investigations at the drum tar site indicated the following:

- Accumulations of tar were observed in the subsurface in Test Pits G, H, I, L, and M. The consistency of the tar varied from a low-viscosity fluid to a hard solid similar to asphalt pavement.
- Tar seeps were visible at two locations along the adjacent segment of the Chena River bank. One of two samples collected from these tar seeps during the 1995 OU 5 RI showed potential for leaching benzene and 4-methylphenol (p-cresol) when analyzed using the toxicity characteristic leaching procedure (TCLP) (HLA, 1996a).
- Debris items (wood, metal, etc. as described in Table 5) were observed in each of the test pits.
- A total of nine drums containing tar or tar-residue were exposed and removed during test pit excavation. The drums were removed from Test Pits H, J, K, L, M, N, O, and P.
- Analyses of test pit stockpile samples indicate that petroleum hydrocarbon concentrations in the tar/soil mixtures range from 0.979 to 1,020 mg/kg as GRO; 2,610 to 104,000 as DRO; and 6,350 to 219,000 as RRO.

Proposed revisions to the State of Alaska's *Oil and Hazardous Substances Pollution Control Regulations* (Alaska Administrative Code, Title 18, Chapter 75 [18 AAC 75]) include petroleum hydrocarbon soil cleanup standards for aromatics and aliphatics in the C_{25} to C_{36} hydrocarbon range (ADEC, 1997). In addition, the ADEC's *Interim Guidance for Non-UST Contaminated Soil Cleanup Levels* (ADEC, 1991) states that soils contaminated by releases which have been documented to consist of only residual-range petroleum hydrocarbons (C_{25} to C_{45}), must be cleaned up to 2,000 mg/kg, or must be cleaned up to a level arrived at in consultation with the department.

Cleanup and recycling, stabilization, or containment of tar and tar-contaminated soil has been initiated at other active and inactive defense sites in Alaska, including Wildwood Air Force Station (HLA, 1996d), Northway Staging Area (HLA, 1997), and Eareckson Air Force Base (Cold Regions Research and Engineering Laboratory [CRREL], 1995).

Table 8. 1996 Results for Analytes Detected in Soil Boring Samples for the Apple Street Site

	Sample Location	AP-7245	AP-7245	AP-7245	AP-7245	AP-7246	AP-7246	AP-7246	AP-7246	AP-7246	AP-7247	AP-7247	AP-7247	AP-7247
	Sample Number	96FWB001SL	96FWB002SL	96FWB003SL	96FWB004SL	96FWB005SL	96FWB006SL	96FWB007SL	96FWB009SL	96FWB010SL	96FWB011SL	96FWB012SL	96FWB013SL	96FWB014SL
	Sample Depth (feet)	5	10	15	20	5	10	10	15	20	6	10	15	20
	Collection Date	9/23/96	9/23/96	9/23/96	9/23/96	9/24/96	9/24/96	9/24/96	9/24/96	9/24/96	9/24/96	9/24/96	9/24/96	9/24/96
Analyte	Potential ARAR	Units												
Diesel-Range Organics (C_{10} - C_{28})	100[a]	mg/kg	55 J	**7,500 J**	4.2 J	**2,400 J**	73	**8,800**	**23,000**	**2,200**	30	11	**980**	**170**	92
Gasoline-Range Organics (C_6 - C_{10})	50[a]	mg/kg	ND(2.9)	**3,100**	**2,400**	ND(2.7)	ND(3.3)	**1,500**	**1,900**	**1,700**	51	3.8	ND(5.3)	ND(2.8)	ND(2.8)

	Sample Location	AP-7248	AP-7248	AP-7248	AP-7248	AP-7248	AP-7249	AP-7249	AP-7249	AP-7249	AP-7250	AP-7250	AP-7250	AP-7250
	Sample Number	96FWB015SL	96FWB016SL	96FWB017SL	96FWB019SL	96FWB020SL	96FWB021SL	96FWB022SL	96FWB023SL	96FWB024SL	96FWB025SL	96FWB026SL	96FWB027SL	96FWB028SL
	Sample Depth (feet)	5	10	10	15	20	5	10	15	20	5	10	15	20
	Date Collected	9/24/96	9/24/96	9/24/96	9/24/96	9/24/96	9/25/96	9/25/96	9/25/96	9/25/96	9/25/96	9/25/96	9/25/96	9/25/96
Analyte	Potential ARAR	Units												
Diesel-Range Organics (C_{10} - C_{28})	100[a]	mg/kg	**300**	33	25	ND(4)	ND(5)	**100 J**	21 J	60 J	ND(4.5)	16 J	**120 J**	ND(4.4)	**6.4 J**
Gasoline-Range Organics (C_6 - C_{10})	50[a]	mg/kg	ND(3.8)	13	ND(2.4)	ND(2.5)	ND(2.9)	ND(2.5)	ND(3.3)	**1,200**	ND(2.7)	ND(2.8)	ND(4.1)	ND(2.6)	ND(3)

ARAR Applicable or relevant and appropriate requirement
mg/kg Milligrams per kilogram
ND Not detected at or above the method reporting limit in parentheses

a. Alaska Department of Environmental Conservation, 1995, and Title 18, Alaska Administrative Code, Chapter 78, Underground Storage Tanks, as amended through November 3, 1995.

Qualifiers

J Estimated value

Note: Bold face numbers indicate concentrations above the potential ARAR.

Table 9. 1996 Results for Analytes Detected in Chena River Bank Sediment Samples from the Apple Street Site

	Sample Location	B028	B029	B030	B031	B031	B032
	Sample Number	96FWB028SD	96FWB029SD	96FWB030SD	96FWB032SD	96FWB033SD	96FWB031SD
	Sample Depth	0.5	0.5	1	0.5	0.5	0.5
	Date Collected	9/28/96	9/28/96	9/28/96	9/28/96	9/28/96	9/28/96
Analyte	Potential ARAR	Units					
Diesel-Range Organics (C_{10} - C_{28})	100[a]	mg/kg	45	41	41	51	50	29

ARAR Applicable or relevant and appropriate requirement
mg/kg Milligrams per kilogram

a. Alaska Department of Environmental Conservation, 1995, and Title 18, Alaska Administrative Code, Chapter 78, Underground Storage Tanks, as amended through November 3, 1995.

5.2 Airfield Pipeline Site

The following recommendations are presented for the Airfield Pipeline Site:

- Drill and sample soil borings in the vicinity of the pipelines to investigate the subsurface conditions in the vadose zone. To date, only groundwater probes have been used to characterize the site. Information about petroleum concentrations in soil has not been collected.
- Address petroleum hydrocarbon contamination at the Airfield Pipeline Site under the State of Alaska/U.S. Army two-party agreement.

5.3 Apple Street Site

The following recommendations are presented for the Apple Street Site:

- Drill and sample two additional borings south of Apple Street to define the southern extent of soil contamination along the wood-stave pipe alignment. The interpreted extent of contamination shown on Figure 6 is not fully defined along the southern boundary, and may extend beneath Apple Street. These borings could be drilled and sampled in conjunction with remedial-phase activities at the site.
- Evaluate remedial alternatives for the Apple Street Site in the OU 5 Feasibility Study.

6.0 REFERENCES

ADEC. 1991. *Interim guidance for non-UST contaminated soil cleanup levels*, July 17.

ADEC. 1997. 18 AAC 75, *Oil and hazardous substances pollution control regulations, cleanup standards, public review draft*, December 18.

CRREL (Cold Regions Research and Engineering Laboratory). 1995. *Dispersion-by-chemical-reaction technology to stabilize asphalt tar, Eareckson Air Force Station, Shemya, Alaska*, CRREL Special Report 95-11, March.

EPA. 1995. Memorandum on risk-based concentration tables, Region III, October.

HLA. 1994. *Phase II site investigation at Building 1565, Fort Wainwright, Alaska*, July 14.

HLA. 1995a. *North airfield groundwater investigation, Fort Wainwright, Alaska*, February 16.

HLA. 1995b. *Final operable unit 5, remedial investigation/feasibility study management plan, Fort Wainwright, Alaska*, August 16.

HLA. 1996a. *Operable unit 5 remedial investigation report, Fort Wainwright, Alaska*, November 22.

HLA. 1996b. *Magnetic anomaly test pit investigation, operable unit 5, work plan, Fort Wainwright, Alaska*, September 23.

HLA. 1996c. *Operable unit 5, magnetic anomaly test pit investigation, site safety and health plan, Fort Wainwright, Alaska*, September 5.

HLA. 1996d. *Remedial action report, interim removal action, Wildwood Air Force Station, contract DACA85-94-D-0015, delivery order 0005, Kenai, Alaska*, October 28.

HLA. 1997. *Remedial action report, Northway Staging Area, interim removal action, Northway, Alaska*, February 28.

Malen. 1997. Personal communication between Mr. Joe Malen of the DPW and Mr. Paul Ramert of HLA, February 28.

USACE. Alaska District, 1990, Memorandum for CENPA-EN-PM-A, *North Point POL, HTW investigation, Fort Wainwright, Alaska*, February 1.

USACE. 1992a. Memorandum for CENPA-EN-MB-C, *Contamination at Building 1565, North Point POL, Fort Wainwright, Alaska*, February 7.

USACE. 1992b. Memorandum for CENPA-EN-MB-C, *Chemical results, Building 1565, North Point POL, Forth Wainwright, Alaska*, February 12.

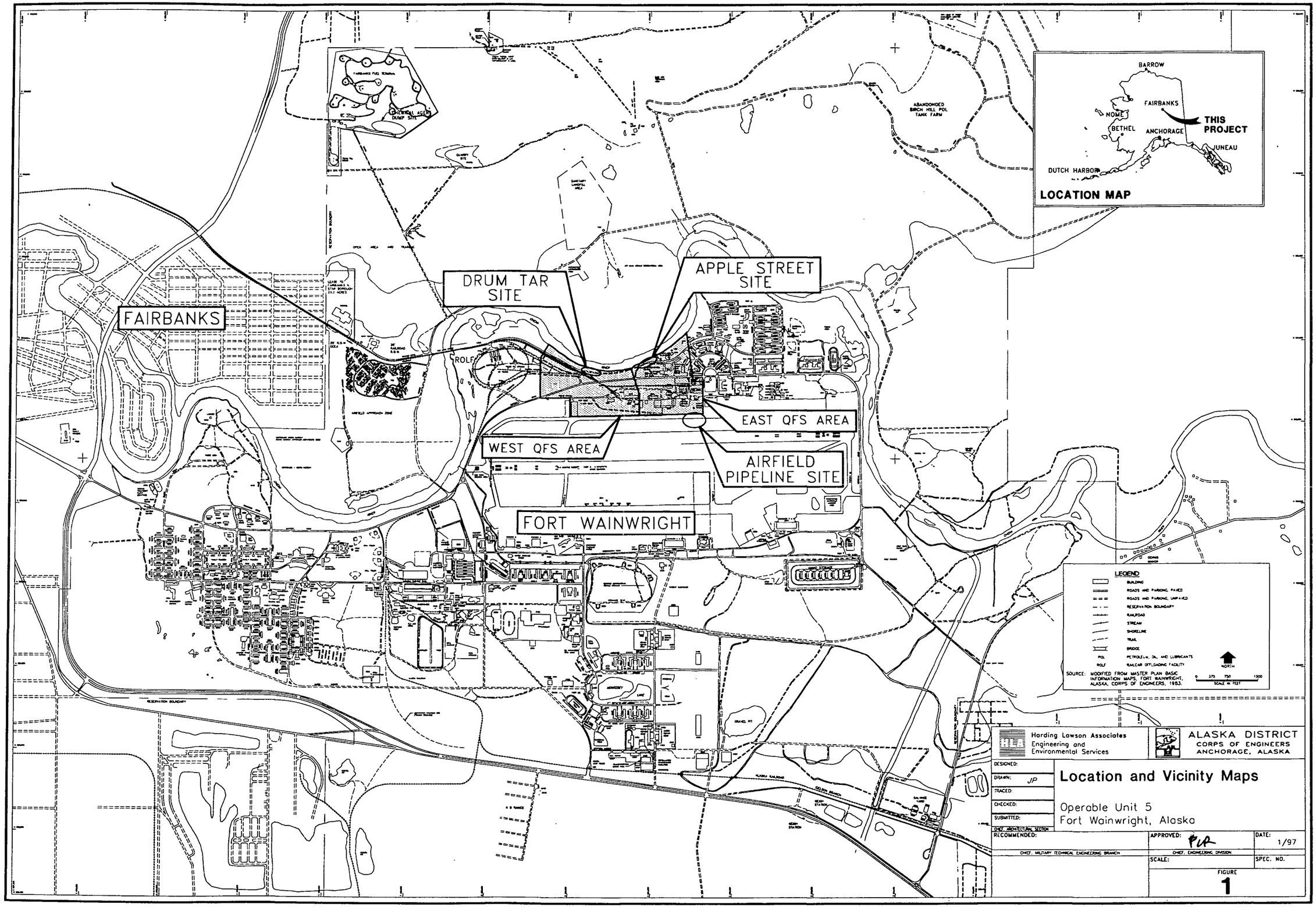
USACE. 1992c. Memorandum for CENPA-EN-EE-AI, *Summary of fieldwork and chemical data report from June 1992 sampling effort, Building 1565, North Point POL, Fort Wainwright, Alaska, Phase I* (FTW103), October 2.

USACE. 1993a. Memorandum for CENPA-EN-TE-DM, *Chemical data report, Hangar 1 auto-sprinkler system, Fort Wainwright, Alaska,* March 22.

USACE. 1993b. Memorandum for CENPA-EN-TE-DM, *Chemical data report, water sampling, Hangar 1 auto-sprinkler system, Fort Wainwright,* Alaska, (FTW-120), April 19.

FIGURES

FIGURES



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Engineering and Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION
RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH
APPROVED: PLR
CHIEF, ENGINEERING DIVISION
DATE: 1/97
SCALE:
SPEC. NO.

Location and Vicinity Maps

Operable Unit 5
Fort Wainwright, Alaska

FIGURE
1

NORTH

THIS DRUM REMOVED BY U.S. ARMY DIRECTORATE OF PUBLIC WORKS ON JULY 25, 1995.

CHENA RIVER

DP-22 DP-14 AP-6892 GP-171 GP-133 SEEP 95FWA002TR SEEP 95FWA003TR 95FWA004TR 95FWA001TR GP-117 GP-106 AP-6879 GP-1 AP-6876 AP-6882 GP-107 GP-108 AP-6893 GP-109 Wood Stove pipes APPLE STREET "UNNAMED" GP-2 1599-PS03 GP-118 GP-169 AP-5975 GP-3 AP-6923 AP-6922 AP-6924 Manhole GP-223 Railroad Tracks AP-6889 GP-168 GP-4 GP-20 AP-6891 GAFFNEY ROAD

A B C D E F G H I J K L M N O P

LEGEND

GP-171	Shallow Groundwater Probe	B	Geophysical Anomaly Location
AP-6892	Groundwater Monitoring Well		Concrete Slab
DP-22	Deep Groundwater Probe		Underground Utility
1599-PS10	Microwell		EM In-Phase Response > 2,500 mV
95FWA003TR	Tar Sample Location from 1995 OU5 RI		EM In-Phase Response 500-1,000 mV
	Junction Box		EM In-Phase Response < 500 mV
	Exposed Drum		M-Scope Anomaly Location
	Vegetation Boundary	mV	Millivolts
	Slope Break (hachures on downslope side)	OU5 RI	Operable Unit 5 Remedial Investigation

0 30 60 120
SCALE IN FEET

NOTE: THESE ANOMOLY LOCATIONS ARE BASED ON GEOPHYSICAL SURVEYS CONDUCTED DURING THE 1995 OPERABLE UNIT 5 REMEDIAL INVESTIGATION. TEST PIT EXCAVATIONS WERE CONDUCTED NEAR THESE ANOMOLIES.

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ANCHORAGE, ALASKA

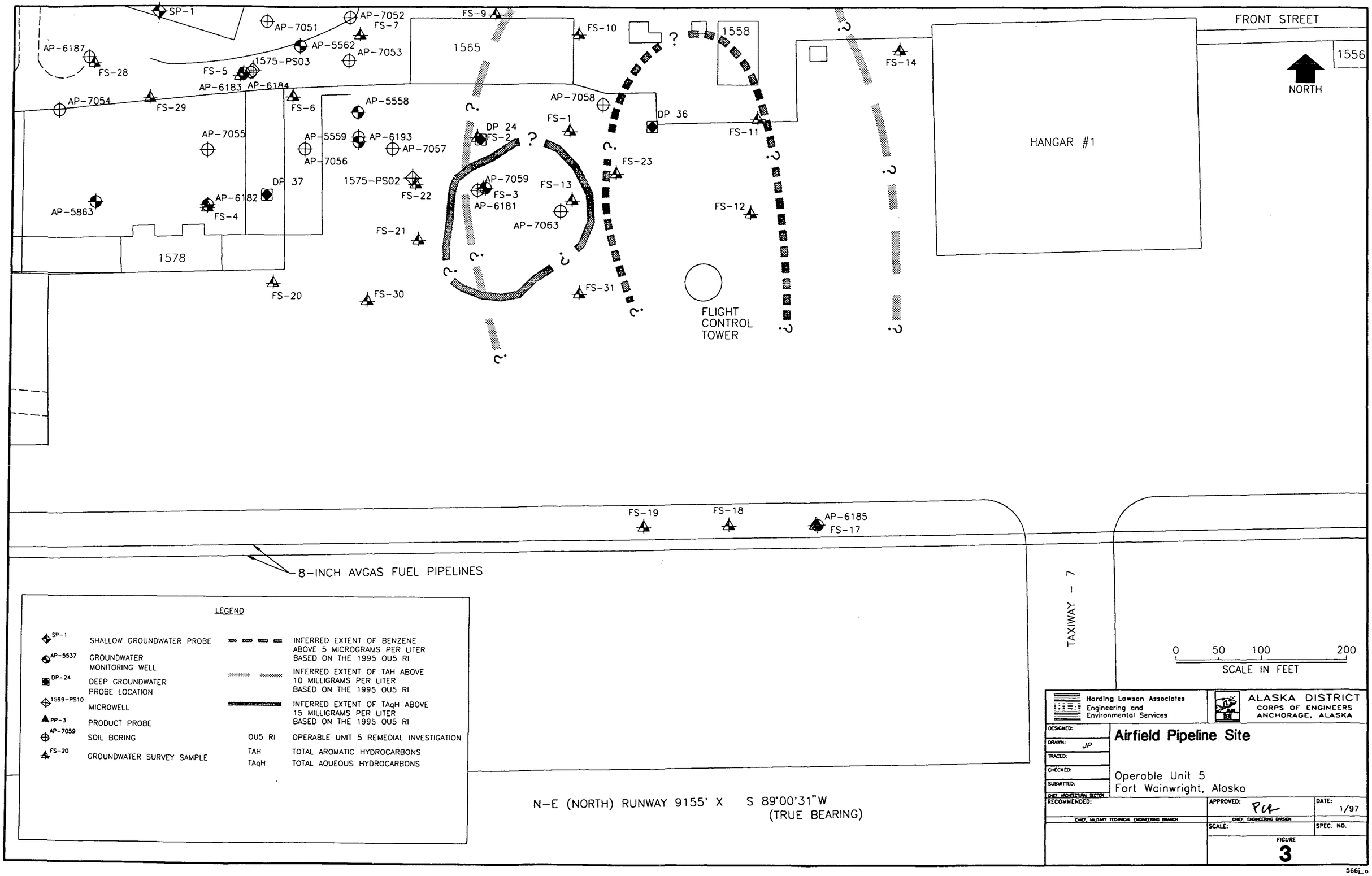
Drum Tar Site

Operable Unit 5
Fort Wainwright, Alaska

DESIGNED:		
DRAWN: BJ		
TRACED:		
CHECKED:		
SUBMITTED: CHIEF, ARCHITECTURAL SECTION	RECOMMENDED: CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH	APPROVED: PCR CHIEF, ENGINEERING DIVISION
		DATE: 1/97
		SCALE:
		SPEC. NO.

FIGURE 2

642j



LEGEND

SP-1	SHALLOW GROUNDWATER PROBE		INFERRED EXTENT OF BENZENE ABOVE 5 MICROGRAMS PER LITER BASED ON THE 1995 OU5 RI
AP-5537	GROUNDWATER MONITORING WELL		INFERRED EXTENT OF TAH ABOVE 10 MILLIGRAMS PER LITER BASED ON THE 1995 OU5 RI
DP-24	DEEP GROUNDWATER PROBE LOCATION		INFERRED EXTENT OF TAqH ABOVE 15 MILLIGRAMS PER LITER BASED ON THE 1995 OU5 RI
1599-PS10	MICROWELL		
PP-3	PRODUCT PROBE		
AP-7059	SOIL BORING	OU5 RI	OPERABLE UNIT 5 REMEDIAL INVESTIGATION
FS-20	GROUNDWATER SURVEY SAMPLE	TAH	TOTAL AROMATIC HYDROCARBONS
		TAqH	TOTAL AQUEOUS HYDROCARBONS

N-E (NORTH) RUNWAY 9155' X S 89°00'31"W (TRUE BEARING)

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ANCHORAGE, ALASKA

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Airfield Pipeline Site

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 1/97

SCALE:

SPEC. NO.

FIGURE
3

566j_o

NORTH

B018
B017
B016
B010
B009
B007
B006
B005
B004
B003
B002

CHENA RIVER

DP 17
AP-7067
AP-6935
AP-6934
AP-6936
GP-208
AP-6885
AP-7070
DP 12
6 INCH WOOD-STAVE PIPE
(Location Approximate)
DP 21
APPLE STREET
APPLE STREET
BUILDING 1060
AP-6390
AP-6894
AP-6926
AP-6925
AP-6927
AP-7073
AP-7072

LEGEND

- SLOPE BREAK (HACHURES ON DOWNSLOPE SIDE)
- GP-15 — SHALLOW GROUNDWATER PROBE
- AP-5537 — EXISTING GROUNDWATER MONITORING WELL
- DP-17 — DEEP GROUNDWATER PROBE LOCATION
- B002 — SEDIMENT SAMPLE
- AP-7059 — EXISTING SOIL BORING

0 25 50 100
APPROXIMATE SCALE IN FEET

Harding Lawson Associates
Engineering and Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

Apple Street Site

Operable Unit 5
Fort Wainwright, Alaska

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION
RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH
APPROVED: PCL
CHIEF, ENGINEERING DIVISION
DATE: 1/97
SCALE:
SPEC. NO.

FIGURE
4

565j

FRONT STREET

1565

1558

1556

1578

HANGAR #1

NORTH

FLIGHT CONTROL TOWER

APPROXIMATE GROUNDWATER FLOW DIRECTION

PS-12 PS-11 PS-4 PS-9 PS-5 PS-6 PS-10 PS-7 PS-8

8-INCH AVGAS FUEL PIPELINES

TAXIWAY - 7

0 50 100 200
SCALE IN FEET

LEGEND

SB-1	EXISTING SHALLOW GROUNDWATER PROBE
PS-6	NEW SHALLOW GROUNDWATER PROBE
AP-6557	EXISTING GROUNDWATER MONITORING WELL
PS-4	NEW DEEP GROUNDWATER PROBE LOCATION
1539-PS10	EXISTING MICROWELL
PS-3	EXISTING PRODUCT PROBE
AP-7059	EXISTING SOIL BORING
FS-22	EXISTING GROUNDWATER SURVEY SAMPLE LOCATION
PS-4	EXISTING DEEP GROUNDWATER PROBE LOCATION

INFERRED EXTENT OF TAH ABOVE 10 MICROGRAMS PER LITER AT 20 FEET BGS

INFERRED EXTENT OF TAH ABOVE 10 MICROGRAMS PER LITER AT 30 FEET BGS

INFERRED EXTENT OF TAqH ABOVE 15 MICROGRAMS PER LITER AT 20 FEET BGS

INFERRED EXTENT OF TAqH ABOVE 15 MICROGRAMS PER LITER AT 30 FEET BGS

OU5 RI OPERABLE UNIT 5 REMEDIAL INVESTIGATION

TAH TOTAL AROMATIC HYDROCARBONS

TAqH TOTAL AQUEOUS HYDROCARBONS

BGS BELOW GROUND SURFACE

N-E (NORTH) RUNWAY 9155' X S 89°00'31"W (TRUE BEARING)

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Inferred Extent of TAH and TAqH in Groundwater at the Airfield Pipeline Site

Operable Unit 5
Fort Wainwright, Alaska

DESIGNED:		
DRAWN: JP		
TRACED:		
CHECKED:		
SUBMITTED: CHIEF, ARCHITECTURAL SECTION		
RECOMMENDED: CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH	APPROVED: PCF CHIEF, ENGINEERING DIVISION	DATE: 1/97
	SCALE:	SPEC. NO.

FIGURE 5

566j_b

NORTH

CHENA RIVER

B018 B017 B016 B010 B009 B007 B006 B032 B031 B030 B029 B028 B004 B003 B002

DP-17 AP-7248 AP-7087 AP-7247 AP-6935 AP-6934 AP-6936 AP-6885 DP-208 AP-7246 AP-7245 AP-7249 AP-7070 DP-12 AP-7250 DP-21

APPLE STREET

6 INCH WOOD-STAVE PIPE
(Location Approximate)

BUILDING 1060

AP-6390 AP-6894 AP-6926 AP-6925 AP-6927 AP-7073 AP-7072

LEGEND

- SLOPE BREAK (HACHURES ON DOWNSLOPE SIDE)
- DP-15 — EXISTING SHALLOW GROUNDWATER PROBE
- AP-6537 — EXISTING GROUNDWATER MONITORING WELL
- DP-17 — EXISTING DEEP GROUNDWATER PROBE LOCATION
- B002 — EXISTING SEDIMENT SAMPLE
- B028 — NEW SEDIMENT SAMPLE
- AP-7059 — EXISTING SOIL BORING
- AP-7059 — NEW SOIL BORING

- INFERRED EXTENT OF DIESEL-RANGE ORGANICS EXCEEDING 100 mg/kg AT 0.5 FEET DEPTH
- INFERRED EXTENT OF DIESEL-RANGE ORGANICS EXCEEDING 100 mg/kg AT 10 FEET DEPTH
- INFERRED EXTENT OF GASOLINE-RANGE ORGANICS EXCEEDING 50 mg/kg AT 10 FEET DEPTH
- INFERRED EXTENT OF DIESEL-RANGE ORGANICS EXCEEDING 100 mg/kg AT 15 FEET DEPTH
- INFERRED EXTENT OF GASOLINE-RANGE ORGANICS EXCEEDING 50 mg/kg AT 15 FEET DEPTH
- INFERRED EXTENT OF DIESEL-RANGE ORGANICS EXCEEDING 100 mg/kg AT 20 FEET DEPTH
- INFERRED EXTENT OF GASOLINE-RANGE ORGANICS EXCEEDING 50 mg/kg AT 20 FEET DEPTH

mg/kg MILLIGRAMS PER KILOGRAM

0 25 50 100
APPROXIMATE SCALE IN FEET

Harding Lawson Associates
Engineering and
Environmental Services

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CORPS OF ENGINEERS
ANCHORAGE, ALASKA

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RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH
APPROVED: Pch
CHIEF, ENGINEERING DIVISION
DATE: 1/97
SCALE:
SPEC. NO.

Inferred Extent of DRO and GRO in Soil at the Apple Street Site

Data Gaps Investigation
Operable Unit 5
Fort Wainwright, Alaska

FIGURE
6

565j

APPENDIX A

APPENDIX A

TEST PIT LOGS

KEY TO SAMPLE TYPES

G = Grab

P = Pocket

RC = Rock Core

S = Thin-Wall Tube

SC = Soil Core

SPT = Standard Penetration Test (2-inch OD split spoon)

SS = Split Spoon (commonly 3-inch OD split spoon)

KEY TO LABORATORY TEST DATA

- ■ – Tube Sample
- ⊠ – Bulk or Classification Sample
- AL – Atterberg Limits
  - LL – Liquid Limit (in %)
  - PL – Plastic Limit (in %)
  - NP – Nonplastic
  - PI – Plasticity Index (in %)
- PSA – Particle-Size Analysis
- -#200 – Minus No. 200 Sieve Size
- OLI – Organic Loss by Ignition
- G_s – Specific Gravity
- SAL – Salinity
- Consol – Consolidation
- UC – Unconfined Compression
- TxUU – Unconsolidated Undrained Triaxial
- TxCU – Consolidated Undrained Triaxial
- TxCD – Consolidated Drained Triaxial
- DS – Consolidated Drained Direct Shear
- DSS – Direct Simple Shear
- LV – Laboratory Vane Shear
- M – Moisture Content

CRITERIA FOR DESCRIBING MOISTURE CONDITION

Condition	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

DESCRIPTION OF ESTIMATED RELATIVE DENSITY AND CONSISTENCY

Primary Soil Type	Estimated Relative Density or Consistency	Standard Penetration Test Resistance[2]	Nonstandard Penetration Test Resistance[3,4]		Range of Unconfined Compressive Strength
		140-pound hammer 30-inch fall 2-inch OD sampler (blows per foot)	300-pound hammer 30-inch fall 3-inch OD sampler (blows per foot)	300-pound hammer 30-inch fall 4.5-inch OD sampler (blows per foot)	
Coarse-grained soils. (More than half of material is larger than No. 200 sieve size.)	Very Loose	<4	<4	<9	Not Applicable
	Loose	4 to 10	4 to 11	9 to 24	Not Applicable
	Medium Dense	10 to 30	11 to 32	24 to 71	Not Applicable
	Dense	30 to 50	32 to 53	71 to 118	Not Applicable
	Very Dense	>50	>53	>118	Not Applicable
Fine-grained soils. (More than half of material is smaller than No. 200 sieve size.)	Very Soft	<2	<2	<5	Less than 250 psf
	Soft	2 to 4	2 to 4	5 to 9	250 to 500
	Medium Stiff	4 to 8	4 to 8	9 to 19	500 to 1000
	Stiff	8 to 15	8 to 15	19 to 35	1000 to 2000
	Very Stiff	15 to 30	15 to 32	35 to 71	2000 to 4000
	Hard	>30	>32	>71	Greater than 4000

1 Relative Density is used to describe coarse-grained soil and nonplastic silt. Consistency describes fine-grained, soil excluding nonplastic silt.

2 Standard Penetration Test Resistance is the number of blows by a 140-pound hammer falling 30 inches to drive 2-inch OD (1-3/8-inch ID) sampler 1 foot.

3 Nonstandard Penetration Test Resistance is the number of blows by a 300-pound hammer falling 30 inches to drive a 3-inch OD (2.5-inch ID) sampler or a 4.5-inch OD (4-inch ID) sampler 1 foot.

4 The relationship between the estimated relative density or consistency and nonstandard penetration test resistance is based on a correlation developed by Y. Lacroix and H.M. Horn in "Direct Determination and Indirect Evaluation of Relative Density and its use on Earthwork Construction Projects," 1973, in *Evaluation of Relative Density and its Role in Geotechnical Projects Involving Cohesionless Soils*, American Society for Testing and Materials STP 523, pp. 251-280.

< Less than
> Greater than
ID Inside diameter
OD Outside diameter

LITHOLOGY

Sloping contacts between soil symbols in the graphic legend of the boring logs are used when contacts are inferred or gradational.

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CHIEF, ARCHITECTURAL SECTION

Key to Sampling and Testing Data

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-1

716j

COARSE-GRAINED SOIL
More than half is larger than No. 200 sieve

DIVISION	FINES CONTENT (-#200)	SAND CONTENT	TYPICAL NAME	GRADATION DESIGNATION	SYMBOL
GRAVEL MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	LESS THAN 5%	<15%	GRAVEL	GP, GW	
		>15%	SANDY GRAVEL	GP, GW	
	5 TO 12 %	<15%	GRAVEL WITH SILT	GP-GM GW-GM	
		>15%	SANDY GRAVEL WITH SILT	GP-GM GW-GM	
		<15%	GRAVEL WITH CLAY	GP-GC GW-GC	
		>15%	SANDY GRAVEL WITH CLAY	GP-GC GW-GC	
	MORE THAN 12%	<15%	SILTY GRAVEL	GM	
		>15%	SILTY SANDY GRAVEL	GM	
		<15%	CLAYEY GRAVEL	GC	
		>15%	CLAYEY SANDY GRAVEL	GC	
SAND LESS THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	LESS THAN 5%	>85%	SAND	SP, SW	
		<85%	GRAVELLY SAND	SP, SW	
	5 TO 12 %	>85%	SAND WITH SILT	SP-SM SW-SM	
		<85%	GRAVELLY SAND WITH SILT	SP-SM SW-SM	
		>85%	SAND WITH CLAY	SP-SC SW-SC	
		<85%	GRAVELLY SAND WITH CLAY	SP-SC SW-SC	
	MORE THAN 12%	>85%	SILTY SAND	SM	
		<85%	SILTY GRAVELLY SAND	SM	
		>85%	CLAYEY SAND	SC	
		<85%	CLAYEY GRAVELLY SAND	SC	

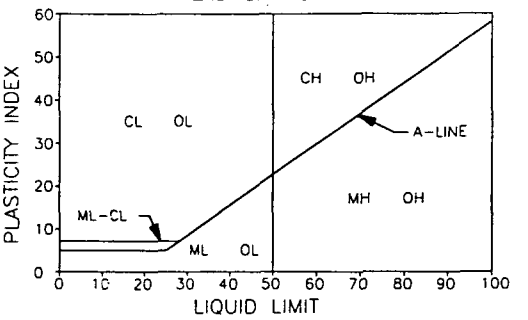
WELL AND POORLY GRADED DESIGNATION

D_{10} – PARTICLE DIAMETER AT WHICH 10 PERCENT OF THE SOIL IS SMALLER
D_{30} – PARTICLE DIAMETER AT WHICH 30 PERCENT OF THE SOIL IS SMALLER
D_{60} – PARTICLE DIAMETER AT WHICH 60 PERCENT OF THE SOIL IS SMALLER

$$C_u = \frac{D_{60}}{D_{10}} \qquad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

FOR GRAVEL: IF $C_u > 4$ AND $1 < C_c < 3$, THEN GW; IF NOT, THEN GP
FOR SAND: IF $C_u > 6$ AND $1 < C_c < 3$, THEN SW; IF NOT, THEN SP

PLASTICITY CHART



FINE-GRAINED SOIL
More than half is smaller than No. 200 sieve

	SAND PLUS GRAVEL CONTENT	SAND CONTENT	NON-ORGANIC FINE-GRAINED SOIL (LL-OVEN DRIED/LL-NOT DRIED > 0.75) TYPICAL NAME	PLASTICITY DESIGNATION LIQUID LIMIT <50%	PLASTICITY DESIGNATION LIQUID LIMIT >50%	SYMBOL	ORGANIC FINE-GRAINED SOIL (LL-OVEN DRIED/LL-NOT DRIED <0.75) TYPICAL NAME	PLASTICITY DESIGNATION LIQUID LIMIT <50%	PLASTICITY DESIGNATION LIQUID LIMIT >50%	SYMBOL
PI PLOTS BELOW A-LINE	<30%	<15%	SILT	ML	MH		ORGANIC SILT	OL	OH	
	<30%	15-29%	SANDY SILT	ML	MH		SANDY ORGANIC SILT	OL	OH	
	15-50%	<15%	GRAVELLY SILT	ML	MH		GRAVELLY ORGANIC SILT	OL	OH	
	30-50%	>15%	GRAVELLY SANDY SILT	ML	MH		GRAVELLY SANDY ORGANIC SILT	OL	OH	
	30-50%	>15%	SANDY GRAVELLY SILT	ML	MH		SANDY GRAVELLY ORGANIC SILT	OL	OH	
PI PLOTS ABOVE A-LINE	<30%	<15%	CLAY	CL	CH		ORGANIC CLAY	OL	OH	
	<30%	15-29%	SANDY CLAY	CL	CH		SANDY ORGANIC CLAY	OL	OH	
	15-50%	<15%	GRAVELLY CLAY	CL	CH		GRAVELLY ORGANIC CLAY	OL	OH	
	30-50%	>15%	GRAVELLY SANDY CLAY	CL	CH		GRAVELLY SANDY ORGANIC CLAY	OL	OH	
	30-50%	>15%	SANDY GRAVELLY CLAY	CL	CH		SANDY GRAVELLY ORGANIC CLAY	OL	OH	

Source: Modified from American Society for Testing and Materials D 2487

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ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, HYDROLOGY BRANCH

Soil Classification System

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, HEAVY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE: NOTED

SPEC. NO.

FIGURE
A-2

716j

LOG OF TEST PIT A

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/17/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples
							0	SILTY GRAVELLY SAND (SM) loose, moist, gray
							1	
							2	
							3	
							4	

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ANCHORAGE, ALASKA

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CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Test Pit A
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PQR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-3

574j

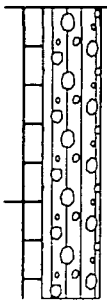
LOG OF TEST PIT B

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/17/96

Depth (ft)	Samples	Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**
0								



SILTY SANDY GRAVEL (GM)
loose, moist, gray

1

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ANCHORAGE, ALASKA

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Log of Test Pit B
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-4

574j

LOG OF TEST PIT C

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/17/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY GRAVELLY SAND (SM) loose, moist, gray, with some organics
							1		

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CHIEF, ARCHITECTURAL SECTION

Log of Test Pit C
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-5

574j

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples

LOG OF TEST PIT D

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

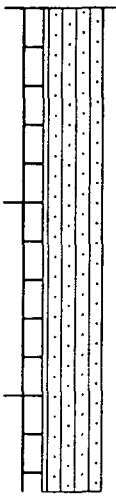
Date Excavated 9/17/96

0

SILTY GRAVELLY SAND (SM)
loose, moist, gray

1

2



Harding Lawson Associates Engineering and Environmental Services		ALASKA DISTRICT CORPS OF ENGINEERS ANCHORAGE, ALASKA
DESIGNED:	**Log of Test Pit D East QFS Area**	
DRAWN: JP		
TRACED:		
CHECKED:		
SUBMITTED: CHIEF, ARCHITECTURAL SECTION	Operable Unit 5 Fort Wainwright, Alaska	
RECOMMENDED: CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH	APPROVED: PCR CHIEF, ENGINEERING DIVISION	DATE: 3/97
	SCALE:	SPEC. NO.
	FIGURE **A-6**	

574j

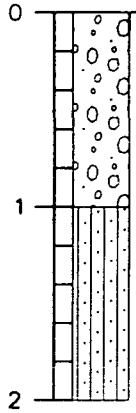
Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples

LOG OF TEST PIT E/F

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/17/96



SANDY GRAVEL (GP)
loose, moist, gray

SILTY GRAVELLY SAND (SM)
loose, moist, gray

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Log of Test Pit E/F
East QFS Area

Operable Unit 5
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CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-7

574j

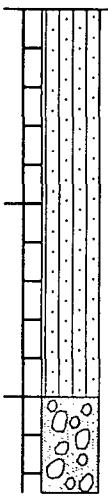
LOG OF TEST PIT G

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/16/96

Depth (ft)	Samples	Sampling Method	Blows/ Foot *	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**
0								
1								
2								



SILTY GRAVELLY SAND (SM)
loose, moist, gray

very dense TAR and fine gravel
from 2.0 to 2.5 feet

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CORPS OF ENGINEERS
ANCHORAGE, ALASKA

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CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Test Pit G
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-8

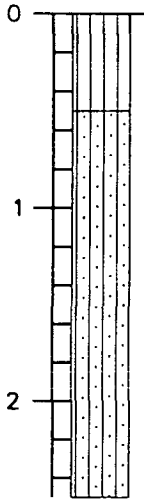
LOG OF TEST PIT H

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/16/96

Depth (ft)	Samples	Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**
0								
1								
2								



GRAVELLY SANDY SILT (ML)
loose, moist, brown, with some organics

SILTY GRAVELLY SAND (SM)
loose, moist, gray, contains wood particles

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Log of Test Pit H
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: FCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-9

574j

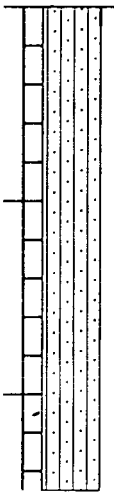
LOG OF TEST PIT 1

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/16/96

Depth (ft)	Samples	Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**
0								



SILTY GRAVELLY SAND (SM)
loose, moist, gray

1

2

Harding Lawson Associates
Engineering and
Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Test Pit 1
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-10

574

LOG OF TEST PIT J

Operator Co. Wagner Excavation Operator Bill Freeman
Field Supervisor C. Marshall Excavator Type Case 580 D
Date Excavated 9/17/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples
							0	
								SILTY GRAVELLY SAND (SM) loose, moist, gray
							1	
								SANDY GRAVEL (GP) loose, moist, gray
							2	
							3	

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CHIEF, ARCHITECTURAL SECTION

Log of Test Pit J
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-11

574j

LOG OF TEST PIT K

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/18/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY GRAVELLY SAND (SM) loose, moist, gray
							1		
							2		SILTY SANDY GRAVEL (GM) loose, moist, gray
							3		

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CHIEF, ARCHITECTURAL SECTION

Log of Test Pit K
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

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CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-12

574j

LOG OF TEST PIT L

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/18/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY GRAVELLY SAND (SM) loose, moist, gray
							1		
							2		

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DRAWN: JP		
TRACED:		
CHECKED:		
SUBMITTED: CHIEF, ARCHITECTURAL SECTION	Operable Unit 5 Fort Wainwright, Alaska	
RECOMMENDED: CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH	APPROVED: PCR CHIEF, ENGINEERING DIVISION	DATE: 3/97
	SCALE:	SPEC. NO.
	FIGURE **A-13**	

574j

LOG OF TEST PIT M

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/18/96

Depth (ft)	Samples	Sampling Method	Blows/ Foot *	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**
0								
1								
2								
3								
4								

SILTY SAND (SM)
loose, moist, gray

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CHIEF, ARCHITECTURAL SECTION

Log of Test Pit M
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-14

574j

LOG OF TEST PIT N

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/18/96

Sampling Method	Blows/ Foot *	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY GRAVELLY SAND (SM) loose, moist, gray
							1		
							2		
							3		

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ANCHORAGE, ALASKA

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CHIEF, ARCHITECTURAL SECTION

Log of Test Pit N
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: RCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-15

574j

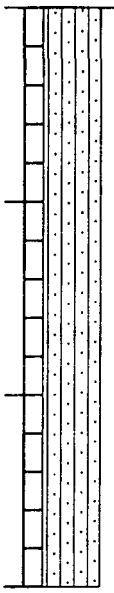
LOG OF TEST PIT O

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/18/96

Depth (ft)	Samples	Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**
0								



SILTY GRAVELLY SAND (SM)
loose, moist, gray

1

2

3

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Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Test Pit O
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PJR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
A-16

574j

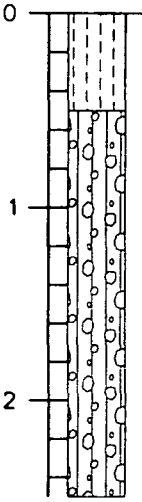
LOG OF TEST PIT P

Operator Co. Wagner Excavation Operator Bill Freeman

Field Supervisor C. Marshall Excavator Type Case 580 D

Date Excavated 9/18/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples
							0	



ORGANIC SILT (OL)
loose, moist, brown

SILTY SANDY GRAVEL (GM)
loose, moist, gray, subrounded gravel to 3-inch diameter

Harding Lawson Associates Engineering and Environmental Services		ALASKA DISTRICT CORPS OF ENGINEERS ANCHORAGE, ALASKA
DESIGNED:	**Log of Test Pit P East QFS Area**	
DRAWN: JP		
TRACED:		
CHECKED:		
SUBMITTED: CHIEF, ARCHITECTURAL SECTION	Operable Unit 5 Fort Wainwright, Alaska	
RECOMMENDED: CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH	APPROVED: PCR CHIEF, ENGINEERING DIVISION	DATE: 3/97
	SCALE:	SPEC. NO.
	FIGURE **A-17**	

574j

APPENDIX B

GROUNDWATER PROBE SAMPLING FORM

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Sampling Form

PROBE NUMBER	Sample Depth (FT)	SAMPLE TYPE (PR, QA, QC, PRTB, QATB)	Total Depth (FT BTOC)	Water (FT BTOC)	Stickup (FT)	Purge Volume (GAL)	pH	COND (mS/cm)	Temp (°C)	DO (mg/L)	TURBIDITY	OVM (ppm)	Sheen?	Odor?	96FW	Site	Three Digit Sample Number	Matrix	DATE 1996	TIME	EPA 8015M GRO	EPA 8020 BTEX	EPA 8260 VOCs	EPA 8270 SVOCs	8270 MS/MSD				LAB	COC Number
PS-4	20	PR	27.79	14.41	0.8	2.75	6.75	0.42	5.7	0.4	224		YES	YES	96FW	B	001	WA	9/21/96	17:00	X	X							Analytica	96FWWA9001
PS-5	20	PR	28.06	21.76	0.8	4	7.04	0.41	4.4	7.42	148		NO	NO	96FW	B	002	WA	9/21/96	17:15	X	X							Analytica	96FWWA9001
PS-6	20	PR	27.52	15.46	0.9	5	7.06	0.41	3.9	1.49	65		NO	NO	96FW	B	003	WA	9/21/96	17:30	X	X							Analytica	96FWWA9001
PS-7	20	PR	28.52	14.69	0.7	6	6.92	0.48	3.5	-0.14	185		NO	NO	96FW	B	004	WA	9/22/96	8:15	X	X							Analytica	96FWWA9001
PS-8	20	PR	22.31	16.04		2	7.04	0.45	4.1	0.4	999		NO	NO	96FW	B	005	WA	9/22/96	10:30	X	X							Analytica	96FWWA9001
PS-4	30	PR	37.37	15.03	1.3	7	7.07	0.45	3.6	0.07	124		YES	YES	96FW	B	006	WA	9/22/96	10:45	X	X							Analytica	96FWWA9001
PS-4	30	QC	37.37	15.03	1.3	7	7.07	0.45	3.6	0.07	124		YES	YES	96FW	B	007	WA	9/22/96	11:00	X	X							Analytica	96FWWA9001
PS-4	30	QA	37.37	15.03	1.3	7	7.07	0.45	3.6	0.07	124		YES	YES	96FW	B	008	WA	9/22/96	11:15	X	X							NPD	96FWWA7001
PS-4	40	PR	46.75	15.53	1.8	10	7.28	0.43	3.4	0.9	40		NO	NO	96FW	B	009	WA	9/22/96	11:45	X	X							Analytica	96FWWA9001
PS-4	50	PR	57	16.57	2.4	12.5	7.27	0.37	3.7	1.49	42		NO	NO	96FW	B	010	WA	9/22/96	12:45	X	X							Analytica	96FWWA9001
PS-4	60	PR	65	16.39	2.8	15.3	7.18	0.35	4.2	0.02	19		NO	NO	96FW	B	011	WA	9/22/96	14:15	X	X							Analytica	96FWWA9001
PS-4	70	PR	74.45	14.56	0.8	19.5	7.26	0.32	4.2	0.49	17		NO	NO	96FW	B	012	WA	9/22/96	17:00	X	X							Analytica	96FWWA9001
		PRTB											NO	NO	96FW	B	013	WA	9/22/96	17:15	X	X							Analytica	96FWWA9001
		QATB											NO	NO	96FW	B	014	WA	9/22/96	17:30	X	X							NPD	96FWWA7001
PS-11	20	PR	28.47	14.31	0.5	4.5	7.32	0.4	4.7	0.55	40		NO	YES	96FW	B	015	WA	9/27/96	9:00	X	X							Analytica	96FWWA9002
PS-9	20	PR	28.18	14.05	0.5	4.5	6.96	0.41	4.6	0.67	106		YES	YES	96FW	B	016	WA	9/27/96	9:30	X	X							Analytica	96FWWA9002
PS-9	20	QC	28.18	14.05	0.5	4.5	6.96	0.41	4.6	0.67	106		YES	YES	96FW	B	017	WA	9/27/96	9:45	X	X							Analytica	96FWWA9002
PS-9	20	QA	28.18	14.05	0.5	4.5	6.96	0.41	4.6	0.67	106		YES	YES	96FW	B	018	WA	9/27/96	10:00	X	X							NPD	96FWWA7002
PS-10	20	PR	27.47	14.26	0.6	4.2	6.91	0.5	4	0.35	34		NO	NO	96FW	B	019	WA	9/27/96	10:15	X	X							Analytica	96FWWA9002
PS-12	20	PR	28.31	20.97	0.8	2.3	6.96	0.58	4.8	1.76	20		NO	NO	96FW	B	020	WA	9/27/96	10:30	X	X							Analytica	96FWWA9002
PS-11	30	PR	37.22	14.9	0.8	8	7.04	0.47	4	0.87	61		NO	NO	96FW	B	021	WA	9/27/96	12:15	X	X							Analytica	96FWWA9002
PS-11	40	PR	48.42	15.5	1.6	10	7.02	0.42	3.9	0.37	42		NO	NO	96FW	B	022	WA	9/27/96	13:15	X	X							Analytica	96FWWA9002
PS-11	40	QC	48.42	15.5	1.6	10	7.02	0.42	3.9	0.37	42		NO	NO	96FW	B	023	WA	9/27/96	13:30	X	X							Analytica	96FWWA9002
PS-11	40	QA	48.42	15.5	1.6	10	7.02	0.42	3.9	0.37	42		NO	NO	96FW	B	024	WA	9/27/96	13:45	X	X							NPD	96FWWA7002
PS-11	50	PR	59.21	16.19	2.1	13.15	7.27	0.37	4.2	1.42	48		NO	NO	96FW	B	025	WA	9/27/96	14:45	X	X							Analytica	96FWWA9002
PS-11	60	PR	69.73	16.49	2.6	16.21	7.13	0.33	4.1	1.08	27		NO	NO	96FW	B	026	WA	9/27/96	16:15	X	X							Analytica	96FWWA9002
PS-11	70	PR	80.2	14.41	0.6	13.5	7.3	0.29	4.4	1.95	34		NO	NO	96FW	B	027	WA	9/27/96	17:50	X	X							Analytica	96FWWA9002
		PRTB													96FW	B	028	WA	9/27/96	18:00	X	X							Analytica	96FWWA9002

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Sampling Form

PROBE NUMBER	Sample Depth (FT)	SAMPLE TYPE (PR, QA, QC, PRTB, QATB)	Total Depth (FT BTOC)	Water (FT BTOC)	Stickup (FT)	Purge Volume (GAL)	pH	COND (mS/cm)	Temp (°C)	DO (mg/L)	TURBIDITY	OVM (ppm)	Sheen?	Odor?	96FW	Site	Three Digit Sample Number	Matrix	DATE 1996	TIME	EPA 8015M GRO	EPA 8020 BTEX	EPA 8260 VOCs	EPA 8270 SVOCs	8270 MS/MSD				LAB	COC Number
		QATB													96FW	B	029	WA	9/27/96	18:15	X	X							NPD	96FWWA7002
		PRTB													96FW	B	030	WA	10/3/96	7:15			X						Analytica	96FWWA9003
		QATB													96FW	B	031	WA	10/3/96	7:30			X						NPD	96FWWA7003
PS-9	20	PR	28.18	14.23	0.5	4.5	5.02	0.46	4.8	0.51	43		YES	YES	96FW	B	032	WA	10/3/96	8:00			X	X					Analytica	96FWWA9003
PS-9	20	QC	28.18	14.23	0.5	4.5	5.02	0.46	4.8	0.51	43		YES	YES	96FW	B	033	WA	10/3/96	8:15			X	X	X				Analytica	96FWWA9003
PS-9	20	QA	28.18	14.23	0.5	4.5	5.02	0.46	4.8	0.51	43		YES	YES	96FW	B	034	WA	10/3/96	8:30			X	X	X				NPD	96FWWA7003
PS-5	20	PR	28.06	15.73	0.8	5	5.35	0.47	4.1	1.96	32		NO	NO	96FW	B	035	WA	10/3/96	11:15			X	X					Analytica	96FWWA9003
PS-7	20	PR	28.52	14.83	0.7	6	5.42	0.55	4.9	2.66	29		NO	NO	96FW	B	036	WA	10/3/96	11:45			X	X					Analytica	96FWWA9003
PS-10	20	PR	27.47	14.51	0.6	4.2	5.73	0.59	4.3	0.68	76		NO	NO	96FW	B	037	WA	10/3/96	12:15			X	X					Analytica	96FWWA9003
PS-12	20	PR	28.31	14.64	0.8	4.3	5.61	0.65	5	1.98	78		NO	NO	96FW	B	038	WA	10/3/96	13:00			X	X					Analytica	96FWWA9003

BTOC	Below top of casing
°C	Degrees celcius
COC	Chain of custody
COND	Conductivity
DO	Dissolved oxygen
EPA	Environmental protection agency
FT	Feet
GAL	Gallons
mg/L	Milligrams per liter
mS/cm	Microsiemens per centimeter
OVM	Organic vapor monitor
ppm	Parts per million
PR	Project sample
PRTB	Project trip blank sample
QA	Quality assurance sample
QATB	Quality assurance trip blank sample
QC	Quality control sample

APPENDIX C

APPENDIX C

SOIL CLASSIFICATION, BORING LOGS, AND LABORATORY GEOTECHNICAL DATA

KEY TO SAMPLE TYPES

G = Grab

P = Pocket

RC = Rock Core

S = Thin-Wall Tube

SC = Soil Core

SPT = Standard Penetration Test (2-inch OD split spoon)

SS = Split Spoon (commonly 3-inch OD split spoon)

KEY TO LABORATORY TEST DATA

- Tube Sample
- Bulk or Classification Sample

AL – Atterberg Limits
- LL – Liquid Limit (in %)
- PL – Plastic Limit (in %)
- NP – Nonplastic
- PI – Plasticity Index (in %)

PSA – Particle-Size Analysis

-#200 – Minus No. 200 Sieve Size

OLI – Organic Loss by Ignition

G_s – Specific Gravity

SAL – Salinity

Consol – Consolidation

UC – Unconfined Compression

TxUU – Unconsolidated Undrained Triaxial

TxCU – Consolidated Undrained Triaxial

TxCD – Consolidated Drained Triaxial

DS – Consolidated Drained Direct Shear

DSS – Direct Simple Shear

LV – Laboratory Vane Shear

M – Moisture Content

CRITERIA FOR DESCRIBING MOISTURE CONDITION

Condition	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

DESCRIPTION OF ESTIMATED RELATIVE DENSITY AND CONSISTENCY

Primary Soil Type	Estimated Relative Density or Consistency	Standard Penetration Test Resistance[2]	Nonstandard Penetration Test Resistance[3,4]		Range of Unconfined Compressive Strength
		140-pound hammer 30-inch fall 2-inch OD sampler (blows per foot)	300-pound hammer 30-inch fall 3-inch OD sampler (blows per foot)	300-pound hammer 30-inch fall 4.5-inch OD sampler (blows per foot)	
Coarse-grained soils. (More than half of material is larger than No. 200 sieve size.)	Very Loose	<4	<4	<9	Not Applicable
	Loose	4 to 10	4 to 11	9 to 24	Not Applicable
	Medium Dense	10 to 30	11 to 32	24 to 71	Not Applicable
	Dense	30 to 50	32 to 53	71 to 118	Not Applicable
	Very Dense	>50	>53	>118	Not Applicable
Fine-grained soils. (More than half of material is smaller than No. 200 sieve size.)	Very Soft	<2	<2	<5	Less than 250 psf
	Soft	2 to 4	2 to 4	5 to 9	250 to 500
	Medium Stiff	4 to 8	4 to 8	9 to 19	500 to 1000
	Stiff	8 to 15	8 to 15	19 to 35	1000 to 2000
	Very Stiff	15 to 30	15 to 32	35 to 71	2000 to 4000
	Hard	>30	>32	>71	Greater than 4000

1 Relative Density is used to describe coarse-grained soil and nonplastic silt. Consistency describes fine-grained, soil excluding nonplastic silt.

2 Standard Penetration Test Resistance is the number of blows by a 140-pound hammer falling 30 inches to drive 2-inch OD (1-3/8-inch ID) sampler 1 foot.

3 Nonstandard Penetration Test Resistance is the number of blows by a 300-pound hammer falling 30 inches to drive a 3-inch OD (2.5-inch ID) sampler or a 4.5-inch OD (4-inch ID) sampler 1 foot.

4 The relationship between the estimated relative density or consistency and nonstandard penetration test resistance is based on a correlation developed by Y. Lacroix and H.M. Horn in "Direct Determination and Indirect Evaluation of Relative Density and its use on Earthwork Construction Projects," 1973, in *Evaluation of Relative Density and its Role in Geotechnical Projects Involving Cohesionless Soils,* American Society for Testing and Materials STP 523, pp. 251-280.

< Less than
> Greater than
ID Inside diameter
OD Outside diameter

LITHOLOGY

Sloping contacts between soil symbols in the graphic legend of the boring logs are used when contacts are inferred or gradational.

Harding Lawson Associates
Engineering and Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Key to Sampling and Testing Data

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE:

SPEC. NO.

FIGURE
C-1

716j

COARSE-GRAINED SOIL
More than half is larger than No. 200 sieve

DIVISION	FINES CONTENT (-#200)	SAND CONTENT	TYPICAL NAME	GRADATION DESIGNATION	SYMBOL
GRAVEL MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	LESS THAN 5%	<15%	GRAVEL	GP, GW	
		>15%	SANDY GRAVEL	GP, GW	
	5 TO 12 %	<15%	GRAVEL WITH SILT	GP-GM GW-GM	
		>15%	SANDY GRAVEL WITH SILT	GP-GM GW-GM	
		<15%	GRAVEL WITH CLAY	GP-GC GW-GC	
		>15%	SANDY GRAVEL WITH CLAY	GP-GC GW-GC	
	MORE THAN 12%	<15%	SILTY GRAVEL	GM	
		>15%	SILTY SANDY GRAVEL	GM	
		<15%	CLAYEY GRAVEL	GC	
		>15%	CLAYEY SANDY GRAVEL	GC	
SAND LESS THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	LESS THAN 5%	>85%	SAND	SP, SW	
		<85%	GRAVELLY SAND	SP, SW	
	5 TO 12 %	>85%	SAND WITH SILT	SP-SM SW-SM	
		<85%	GRAVELLY SAND WITH SILT	SP-SM SW-SM	
		>85%	SAND WITH CLAY	SP-SC SW-SC	
		<85%	GRAVELLY SAND WITH CLAY	SP-SC SW-SC	
	MORE THAN 12%	>85%	SILTY SAND	SM	
		<85%	SILTY GRAVELLY SAND	SM	
		>85%	CLAYEY SAND	SC	
		<85%	CLAYEY GRAVELLY SAND	SC	

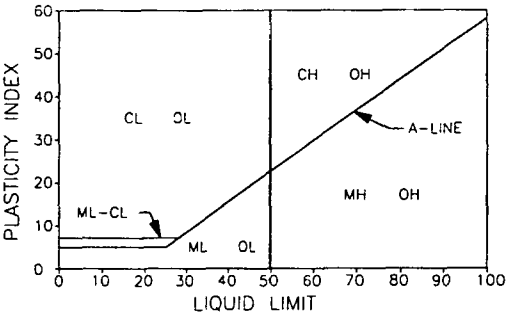
WELL AND POORLY GRADED DESIGNATION

D_{10} – PARTICLE DIAMETER AT WHICH 10 PERCENT OF THE SOIL IS SMALLER
D_{30} – PARTICLE DIAMETER AT WHICH 30 PERCENT OF THE SOIL IS SMALLER
D_{60} – PARTICLE DIAMETER AT WHICH 60 PERCENT OF THE SOIL IS SMALLER

$$C_u = \frac{D_{60}}{D_{10}} \qquad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

FOR GRAVEL: IF $C_u > 4$ AND $1 < C_c < 3$, THEN GW; IF NOT, THEN GP
FOR SAND: IF $C_u > 6$ AND $1 < C_c < 3$, THEN SW; IF NOT, THEN SP

PLASTICITY CHART



FINE-GRAINED SOIL
More than half is smaller than No. 200 sieve

	SAND PLUS GRAVEL CONTENT	SAND CONTENT	NON-ORGANIC FINE-GRAINED SOIL (LL-OVEN DRIED/LL-NOT DRIED > 0.75) TYPICAL NAME	PLASTICITY DESIGNATION LIQUID LIMIT <50%	PLASTICITY DESIGNATION LIQUID LIMIT >50%	SYMBOL	ORGANIC FINE-GRAINED SOIL (LL-OVEN DRIED/LL-NOT DRIED <0.75) TYPICAL NAME	PLASTICITY DESIGNATION LIQUID LIMIT <50%	PLASTICITY DESIGNATION LIQUID LIMIT >50%	SYMBOL
PI PLOTS BELOW A-LINE	<30%	<15%	SILT	ML	MH		ORGANIC SILT	OL	OH	
	<30%	15-29%	SANDY SILT	ML	MH		SANDY ORGANIC SILT	OL	OH	
	15-50%	<15%	GRAVELLY SILT	ML	MH		GRAVELLY ORGANIC SILT	OL	OH	
	30-50%	>15%	GRAVELLY SANDY SILT	ML	MH		GRAVELLY SANDY ORGANIC SILT	OL	OH	
	30-50%	>15%	SANDY GRAVELLY SILT	ML	MH		SANDY GRAVELLY ORGANIC SILT	OL	OH	
PI PLOTS ABOVE A-LINE	<30%	<15%	CLAY	CL	CH		ORGANIC CLAY	OL	OH	
	<30%	15-29%	SANDY CLAY	CL	CH		SANDY ORGANIC CLAY	OL	OH	
	15-50%	<15%	GRAVELLY CLAY	CL	CH		GRAVELLY ORGANIC CLAY	OL	OH	
	30-50%	>15%	GRAVELLY SANDY CLAY	CL	CH		GRAVELLY SANDY ORGANIC CLAY	OL	OH	
	30-50%	>15%	SANDY GRAVELLY CLAY	CL	CH		SANDY GRAVELLY ORGANIC CLAY	OL	OH	

Source: Modified from American Society for Testing and Materials D 2487

Harding Lawson Associates
Engineering and Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Soil Classification System

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PGR
CHIEF, ENGINEERING DIVISION

DATE: 3/97

SCALE: NOTED

SPEC. NO.

FIGURE
C-2

716j

SOIL FROST CLASSIFICATION SYSTEM

Frost Group	Kind of soil	Percentage finer than 0.02 mm by weight	Typical soil types under Unified Soil Classification System
NFS	(a) Gravel Crushed stone Crushed rock (b) Sand	0–1.5 0–3	GW,GP SW,SP
PFS	(a) Gravel Crushed stone Crushed rock (b) Sand	1.5–3 3–10	GW,GP SW,SP
S1	Gravelly soil	3–6	GW,GP,GW–GM,GP–GM
S2	Sandy soil	3–6	SW,SP,SW–SM,SP–SM
F1	Gravelly soil	6 to 10	GM,GW–GM,GP–GM
F2	(a) Gravelly soil (b) Sand	10 to 20 6 to 15	GM,GW–GM,GP–GM SM,SW–SM,SP–SM
F3	(a) Gravelly soil (b) Sand, except very fine silty sand (c) Clay, PI>12	Over 20 Over 15 –	GM,GC SM,SC CL,CH
F4	(a) All silt (b) Very fine silty sand (c) Clay, PI<12 (d) Varved clay and other fine-grained, bonded sediment	– Over 15 – –	ML,MH SM CL,CL–ML CL,CL–ML,CH,ML&SM

Source: Corps of Engineers, US Army, Special Report 83-27, September 1983

NFS Non Frost Susceptible
PFS Possibly Frost Susceptible
S1 Slightly Frost Susceptible
S2 Slightly Frost Susceptible
F1 Slightly Frost Susceptible
F2 Slightly to Moderately Frost Susceptible
F3 Moderately Frost Susceptible
F4 Highly Frost Susceptible

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CHIEF, ARCHITECTURAL SECTION

Soil Frost Classification System

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 3/97
SCALE:
SPEC. NO.

FIGURE
C-3

716J

TEMP ID. EB-18

LOG OF BORING AP-7245

Drilling Co. SP Enterprises Driller R. Wagster
Field Engineer C. Marshall Drill Rig Mobile B-61
Equipment Hollow Stem Auger
Northing 292,405.4 Easting 303,963.5
Elevation 445.0 Date Drilled 9/23/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY GRAVELLY SAND (SM) very loose, moist, brown
SS	5	0			36.7	B001SL	5		
							10		SILT with SAND (ML), F4 loose, moist, gray
SS	20	347				B002SL			SANDY GRAVEL (GP), NFS loose to medium dense, moist to wet, gray
SS	36	410			1.6	B003SL	15		▽ groundwater level encountered during drilling
SS	11	2.6				B004SL	20		boring backfilled with bentonite

Note: * Blow counts obtained by driving a 4.5-inch O.D. split-spoon sampler 24 inches with a 300-pound hammer falling 30 inches. The blow count is the number of blows required to advance the sampler the final 12 inches unless otherwise noted.

** The prefix 96FW has been omitted for brevity. QA/QC duplicate samples in italics.

NA - Not analyzed

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ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

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CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Boring AP-7245
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 10/96
SCALE:
SPEC. NO.

FIGURE
C-4

TEMP ID. EB-19

LOG OF BORING AP-7246

Drilling Co. SP Enterprises Driller R. Wagster
Field Engineer C. Marshall Drill Rig Mobile B-61
Equipment Hollow Stem Auger
Northing 292,449.4 Easting 304,040.1
Elevation 445.3 Date Drilled 9/24/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY SAND with GRAVEL (SM) very loose, moist, gray
									percent gravel decreases below 3.0 feet
SS	4	0				B005SL	5		
									SILT (ML), F4 very loose, moist, brown, non-plastic, with fibrous organics throughout
SS	7	195				B006SL *B007SL* *B008SL*	10		
SS	25	335			2.6	B009SL	15		▽ groundwater level encountered during drilling SANDY GRAVEL (GP), NFS loose to medium dense, wet, gray
SS	12	30				B010SL	20		boring backfilled with bentonite

Note: * Blow counts obtained by driving a 4.5-inch O.D. split-spoon sampler 24 inches with a 300-pound hammer falling 30 inches. The blow count is the number of blows required to advance the sampler the final 12 inches unless otherwise noted.

** The prefix 96FW has been omitted for brevity. QA/QC duplicate samples in italics.

NA - Not analyzed

Harding Lawson Associates
Engineering and Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
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CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Boring AP-7246
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 10/96
SCALE:
SPEC. NO.

FIGURE
C-5

574j

TEMP ID. EB-20

LOG OF BORING AP-7247

Drilling Co. SP Enterprises Driller R. Wagster
Field Engineer C. Marshall Drill Rig Mobile B-61
Equipment Hollow Stem Auger
Northing 292,496.7 Easting 304,128.0
Elevation 445.2 Date Drilled 9/24/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY GRAVEL with SAND (GM) very loose, moist, gray
									CONCRETE
							5		
SS	14	2			5.9	B011SL			SANDY GRAVEL with SILT (GW-GM) loose, moist, gray
SS	17	0				B012SL	10		ORGANIC SILT (OL) loose, moist, brown, with wood debris
SS	23	0				B013SL	15		▽ groundwater level encountered during drilling SANDY GRAVEL (GP) loose, wet, gray
SS	18	1			3.6	B014SL	20		boring backfilled with bentonite

Note: * Blow counts obtained by driving a 4.5-inch O.D. split-spoon sampler 24 inches with a 300-pound hammer falling 30 inches. The blow count is the number of blows required to advance the sampler the final 12 inches unless otherwise noted.

** The prefix 96FW has been omitted for brevity. QA/QC duplicate samples in italics.

NA - Not analyzed

Harding Lawson Associates
Engineering and Environmental Services

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CORPS OF ENGINEERS
ANCHORAGE, ALASKA

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CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Boring AP-7247
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 10/96
SCALE:
SPEC. NO.

FIGURE
C-6

574j

TEMP ID. EB-21

LOG OF BORING AP-7248

Drilling Co. SP Enterprises Driller R. Wagster
Field Engineer C. Marshall Drill Rig Mobile B-61
Equipment Hollow Stem Auger
Northing 292,530.4 Easting 304,217.3
Elevation 444.0 Date Drilled 9/24/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY SAND with GRAVEL (SM) very loose, moist, brown
SS	6	1				B015SL	5		contains some organics at 5 feet
SS	29	0			2.4	B016SL *B017SL* *B018SL*	10		GRAVEL (GP), NFS loose to medium dense, moist to wet, gray with wood debris between 10 and 12 feet
									percent sand increasing below 14 feet
SS	12	0				B019SL	15	▽	groundwater level encountered during drilling
SS	18	0			1.4	B020SL	20		SAND (SP), NFS loose, wet, gray boring backfilled with bentonite

Note: * Blow counts obtained by driving a 4.5-inch O.D. split-spoon sampler 24 inches with a 300-pound hammer falling 30 inches. The blow count is the number of blows required to advance the sampler the final 12 inches unless otherwise noted.

** The prefix 96FW has been omitted for brevity. QA/QC duplicate samples in italics.

NA – Not analyzed

Harding Lawson Associates
Engineering and Environmental Services

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ANCHORAGE, ALASKA

DESIGNED:
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CHIEF, ARCHITECTURAL SECTION

Log of Boring AP-7248
East QFS Area
Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: RCR
CHIEF, ENGINEERING DIVISION

DATE: 10/96
SCALE:
SPEC. NO.

FIGURE
C-7

5741

TEMP ID. EB-22

LOG OF BORING AP-7249

Drilling Co. SP Enterprises Driller R. Wagster

Field Engineer C. Marshall Drill Rig Mobile B-61

Equipment Hollow Stem Auger

Northing 292,391.5 Easting 303,915.2

Elevation 445.8 Date Drilled 9/25/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY SAND with GRAVEL (SM) very loose, moist, gray
SS	12	1			11.4	B021SL	5		SANDY GRAVEL with SILT (GP-GM) loose, moist, gray, with trace concrete debris
SS	5	1.3				B022SL	10		SILT with SAND (ML), F4 very loose, moist, gray
SS	26	296			2.0	B023SL	15		▽ groundwater level encountered during drilling SANDY GRAVEL (GP), NFS loose, to medium dense, moist to wet, gray
SS	19	1.8				B024SL	20		boring backfilled with bentonite

Note: * Blow counts obtained by driving a 4.5-inch O.D. split-spoon sampler 24 inches with a 300-pound hammer falling 30 inches. The blow count is the number of blows required to advance the sampler the final 12 inches unless otherwise noted.

** The prefix 96FW has been omitted for brevity. QA/QC duplicate samples in italics.

NA - Not analyzed

Harding Lawson Associates
Engineering and Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

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CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Boring AP-7249
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: FCR
CHIEF, ENGINEERING DIVISION

DATE: 10/96

SCALE:

SPEC. NO.

FIGURE
C-8

574j

TEMP ID. EB-23

LOG OF BORING AP-7250

Drilling Co. SP Enterprises Driller R. Wagster
Field Engineer C. Marshall Drill Rig Mobile B-61
Equipment Hollow Stem Auger
Northing 292,373.0 Easting 303,867.6
Elevation 445.4 Date Drilled 9/25/96

Sampling Method	Blows/ * Foot	OVM (ppm)	Specific Gravity	Moisture Content (%)	PSA -200(%)	Sample Number**	Depth (ft)	Samples	
							0		SILTY GRAVELLY SAND (SM) very loose, moist, gray drilling rate very slow between 2.5 and 4.5 feet, possible concrete
SS	4	1			51.0	B025SL	5		SANDY SILT (ML), F4 very loose, moist, gray wood debris at 8.5 feet
SS	7	1				B026SL	10		
SS	15	1.3				B027SL	15		SILTY GRAVEL with SAND (GM) loose, wet, gray ▽ groundwater level encountered during drilling SANDY GRAVEL (GP) loose, wet, gray
SS	12	0			3.6	B028SL	20		boring backfilled with bentonite

Note: * Blow counts obtained by driving a 4.5-inch O.D. split-spoon sampler 24 inches with a 300-pound hammer falling 30 inches. The blow count is the number of blows required to advance the sampler the final 12 inches unless otherwise noted.

** The prefix 96FW has been omitted for brevity. QA/QC duplicate samples in italics.

NA - Not analyzed

Harding Lawson Associates
Engineering and Environmental Services

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: JP
TRACED:
CHECKED:
SUBMITTED:
CHIEF, ARCHITECTURAL SECTION

Log of Boring AP-7250
East QFS Area

Operable Unit 5
Fort Wainwright, Alaska

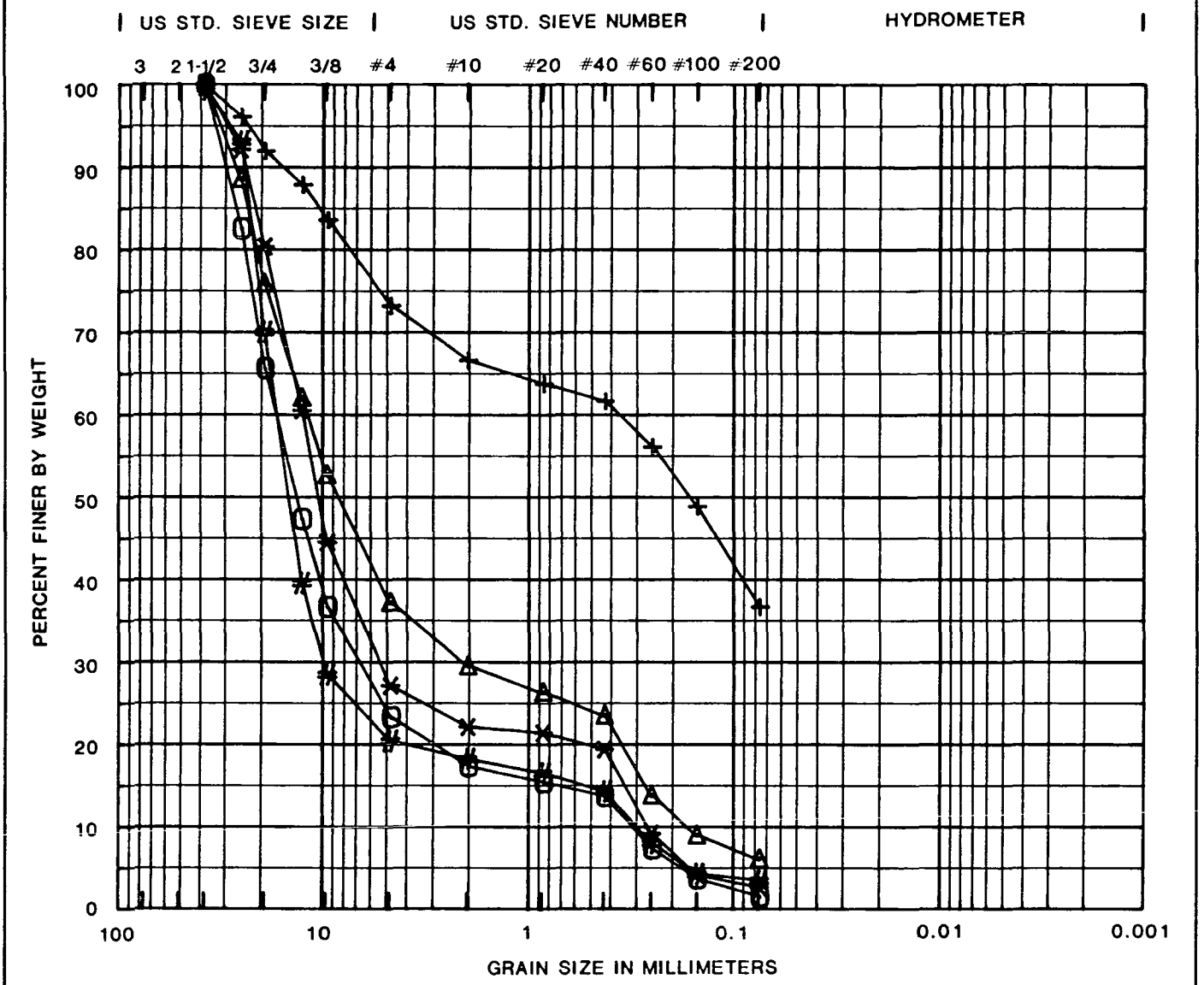
RECOMMENDED:
CHIEF, MILITARY TECHNICAL ENGINEERING BRANCH

APPROVED: PCR
CHIEF, ENGINEERING DIVISION

DATE: 10/96
SCALE:
SPEC. NO.

FIGURE
C-9

574j



COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	BORING NUMBER	DEPTH (feet)	CLASSIFICATION
+	AP-7245	5.0	SILTY GRAVELLY SAND (SM)
0	AP-7245	15.0	SANDY GRAVEL (GP)
*	AP-7246	15.0	SANDY GRAVEL (GP)
Δ	AP-7247	6.0	SANDY GRAVEL WITH SILT (GW-GM)
#	AP-7247	20.0	SANDY GRAVEL (GP)

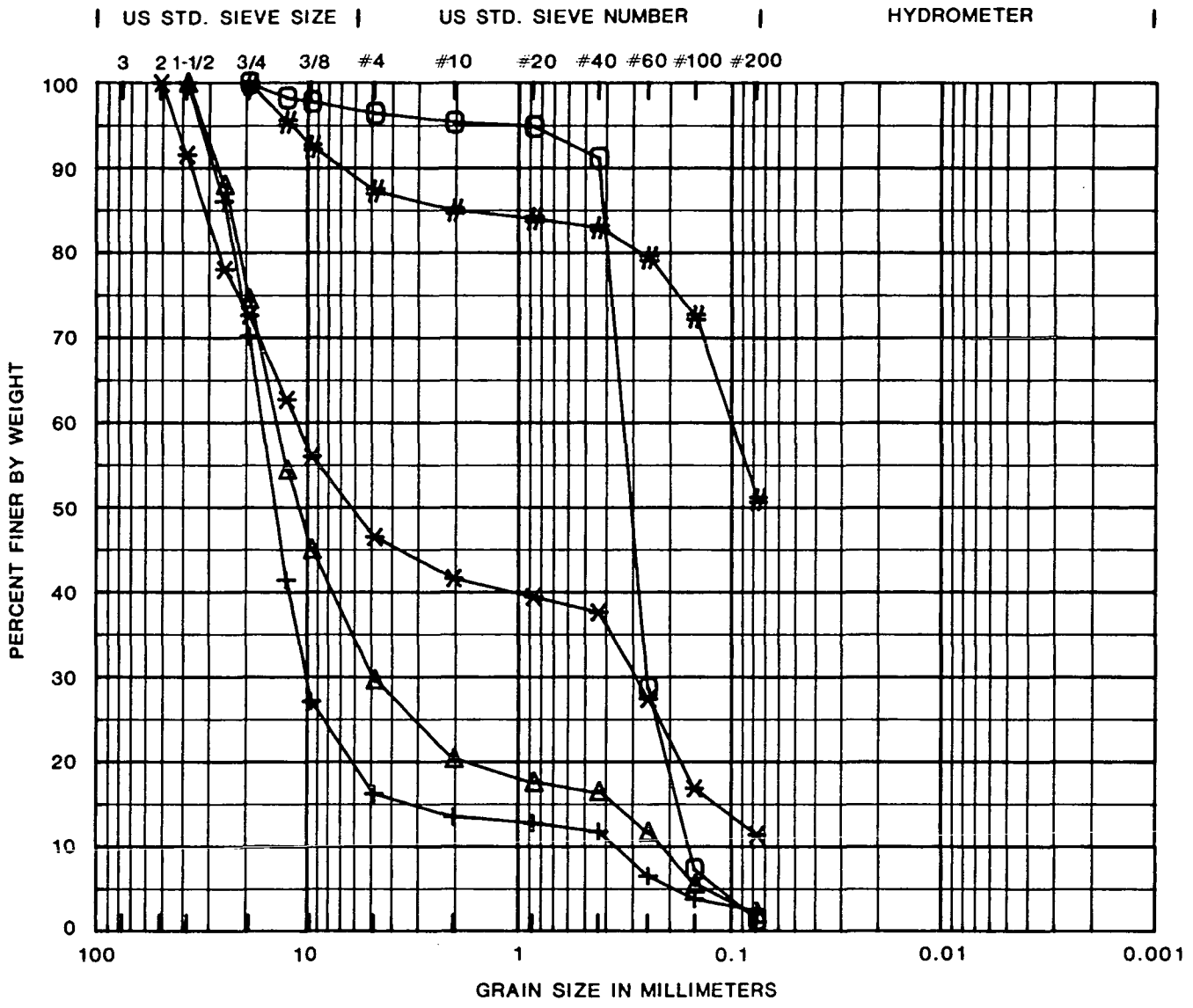
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

Operable Unit 5
Fort Wainwright, Alaska

PLATE
C-10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	32523	JED	11/96		



COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	BORING NUMBER	DEPTH (feet)	CLASSIFICATION
+	AP-7248	10.0	GRAVEL (GP)
0	AP-7248	20.0	SAND (SP)
*	AP-7249	5.0	SANDY GRAVEL WITH SILT (GP-GM)
△	AP-7249	15.0	SANDY GRAVEL (GP)
#	AP-7250	5.0	SANDY SILT (ML), F4

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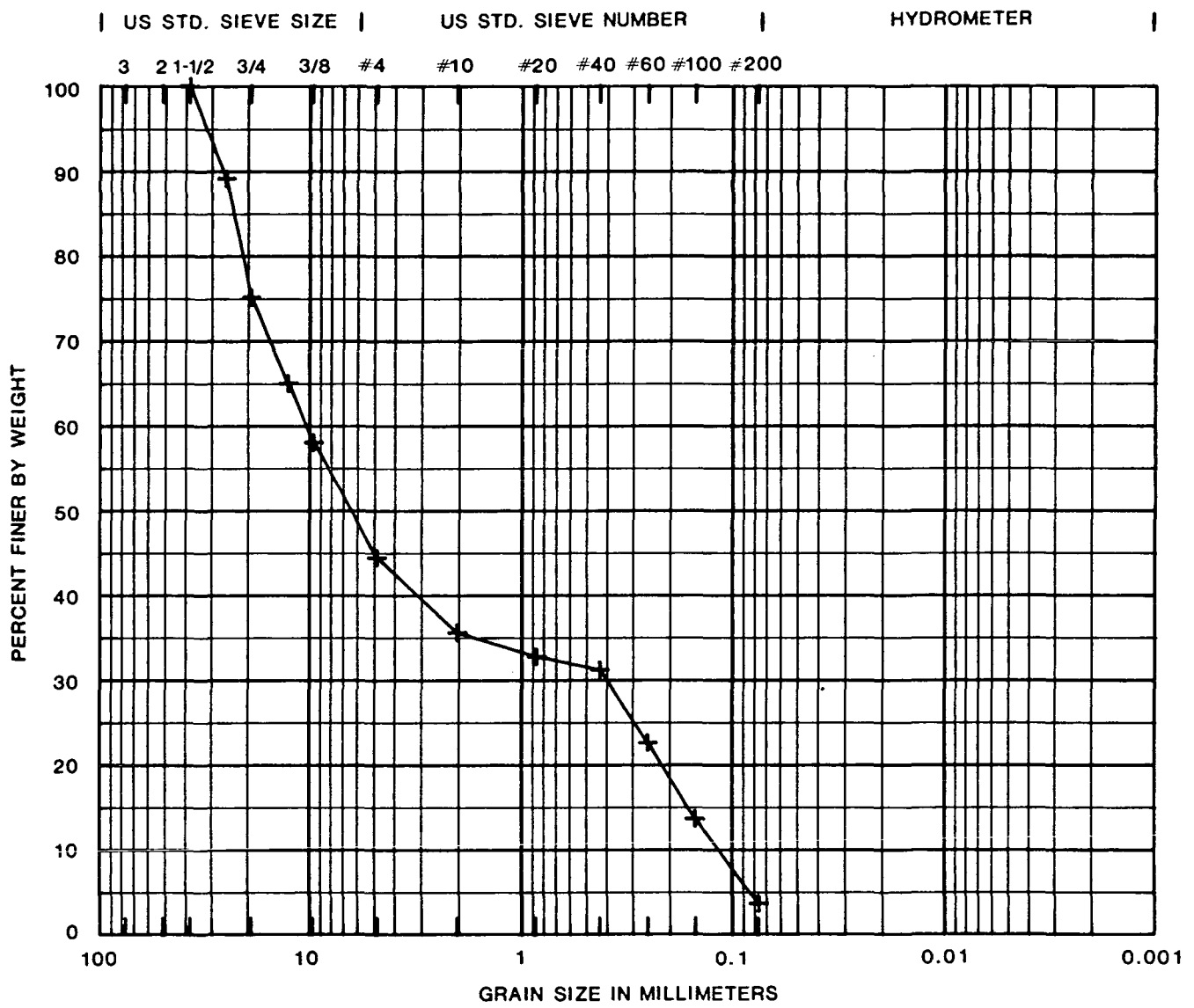
Engineers, Geologists
& Geophysicists

Particle Size Analysis

Operable Unit 5
Fort Wainwright, Alaska

PLATE
C-11

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	32523	JED	11/96		



COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	BORING NUMBER	DEPTH (feet)	CLASSIFICATION
+	AP-7250	20.0	SANDY GRAVEL (GP)

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Engineers, Geologists
& Geophysicists

Particle Size Analysis

Operable Unit 5
Fort Wainwright, Alaska

PLATE
C-12

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	32523	JED	11/96		

APPENDIX D

APPENDIX D

SURVEY DATA

APPENDIX D

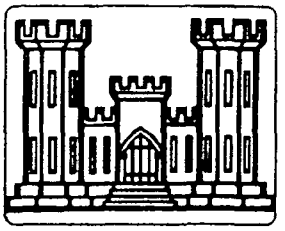
Location Survey Data

Description	Fort Wainwright Grid Northing (feet)	Fort Wainwright Grid Easting (feet)	Ground Elevation (feet)	Top of Casing Elevation	Notes
Sediment Sample Stations					
BO28	292,434.9	303,936.8	429.1	NA	
BO29	292,449.3	303,965.5	428.7	NA	
BO30	292,466.5	303,985.9	428.2	NA	
BO31	292,475.9	304,016.3	428.3	NA	
BO32	292,501.2	304,035.3	428.6	NA	
Soil Borings					
AP-7245	292,405.4	303,963.5	445.0	NA	
AP-7246	292,449.4	304,040.1	445.3	NA	
AP-7247	292,496.7	304,128.0	445.2	NA	
AP-7248	292,530.4	304,217.3	444.0	NA	
AP-7249	292,391.5	303,915.2	445.8	NA	
AP-7250	292,373.0	303,867.6	445.4	NA	
Groundwater Probes					
PS-4	290,967.1	304,953.3	444.6	445.49	Basis of elevation "NTW 5"
PS-5	290,968.6	305,138.2	444.8	446.34	Basis of elevation "NTW 5"
PS-6	290,972.5	305,309.6	445.6	446.63	Basis of elevation "NTW 5"
PS-7	290,723.2	304,963.1	445.3	445.96	Basis of elevation "NTW 5"
PS-8	290,729.1	305,313.9	445.6	446.52	Basis of elevation "NTW 5"
PS-9	290,967.4	305,003.2	444.6	445.12	Basis of elevation "NTW 5"
PS-10	290,917.4	304,952.5	444.6	445.30	Basis of elevation "NTW 5"
PS-11	290,965.9	304,853.6	444.6	445.25	Basis of elevation "NTW 5"
PS-12	290,966.6	304,801.3	444.3	445.35	Basis of elevation "NTW 5"
Control Monuments					
LFC 66A	291,901.81	303,283.11		444.98	COE SBC, basis of coordinations
MBL 31A	292,059.44	306,027.23		449.60	COE SBC, basis of coordinations
NTW 5	290,918	304,963		444.90	COE mon., basis of elevations

COE U.S. Army Corps of Engineers

APPENDIX E

CHEMICAL QUALITY ASSURANCE REPORTS



U.S. Army Corps of Engineers
North Pacific Division Laboratory
Troutdale, Oregon

Chemical Quality Assurance Report

OU-5 Magnetic Anomaly, Test Pits
Ft. WW

NPDL Work Order Number: 96-0379

Prepared for: **Alaska District**

Approved by: Pamela D. Hertzberg

PAMELA D. HERTZBERG, Chief
Project Management and Data Evaluation Branch

CHEMICAL QUALITY ASSURANCE REPORT

OU-5 MAGNETIC ANOMALY, TEST PITS, FT. WW

1. **SUMMARY:** The aromatic volatile organics (AVO) data reported as detects should be considered tentatively identified because of a lack of reported confirmation data. With this caveat, the data quality is acceptable. The primary and quality assurance (QA) data comparisons are presented in Table I and the AVO data do not agree.

2. **BACKGROUND:** The project samples were collected September 20, 1996 and received by the analytical laboratories September 21 and 23, 1996.

3. **OBJECTIVES:**

   3.1 Eight soil samples (including one blind duplicate) were collected to determine the extent of the chemical contamination on the site.

   3.2 One QA soil sample was submitted to evaluate the primary laboratory's data.

4. **PROJECT ORGANIZATION:**

   4.1 The project samples were collected by Harding Lawson Associates, Anchorage, Alaska.

   4.2 The primary samples were analyzed by CT&E Environmental Services, Inc. (CT&E), Anchorage, Alaska.

   4.3 The QA samples were analyzed by Applied Research and Development Laboratory, Inc. (ARDL), Mt. Vernon, Illinois.

5. **ANALYTICAL REFERENCES:**

Number	Title	Date
SW-846, Third Edition	Test Methods for Evaluating Solid Waste - Final Update II	1/95
ADEC UST Regulations, 18 AAC 78	Interim Analytical Methods for Petroleum Compounds in Soil and Water	2/92
ADEC UST Regulations, 18 AAC 78, Appendices D, E & F	Analytical Methods for Petroleum Compounds in Soil and Water	11/95

6. EVALUATION OF THE PRIMARY LABORATORY'S DATA:

6.1 Primary Laboratory Methods: The following is a listing of preparation and analytical methods used by the laboratory as reported in their data deliverable.

Primary Laboratory	Parameter	Preparation Method	Analytical Method
CT&E	AVO	--	EPA 8020
	GRO	--	ADEC 8015 Mod.
	DRO	--	ADEC 8100 Mod.
	RRO	--	ADEC AK103

-- = not reported

6.2 Chain of Custody Records and Sample Cooler Receipt Forms: All chain of custody (COC) records and sample shipping conditions, as documented on the sample cooler receipt (SCR) form, were evaluated according to EPA and U.S. Army Corps of Engineers (USACE) ER 1110-1-263 regulations and the following notations made. The cooler was received at the laboratory with a temperature of 6.1 °C which is above the EPA recommended temperature range of 4 ± 2 °C.

6.3 Sample Holding Times, Reporting Limits, Laboratory Method Blanks, Accuracy and Precision: Sample holding times and detection/reporting limits were evaluated per EPA and Alaska Department of Environmental Conservation (ADEC) criteria. The laboratory method blanks were evaluated for the absence of targeted analytes. The extraction efficiency, accuracy and precision of the data, as represented by surrogate, matrix spike (MS), matrix spike duplicate (MSD), laboratory control (LC) and laboratory control duplicate (LCD) recoveries and relative percent difference (RPD) results, were compared to EPA, ADEC or laboratory established (LE) quality control (QC) acceptance limits for out of control results.

6.3.1 Aromatic Volatile Organics: The AVO analytes reported as detects should be considered tentatively identified as secondary column confirmation results were not reported. With this caveat noted, no other deficiencies were noted with the QC results and the data quality is acceptable.

6.3.2 Gasoline Range Organics: One of two surrogate recoveries was above the ADEC QC limit for samples 96FWA002SL and -A003SL. The extraction efficiency is acceptable based the remaining recovery within QC limits. No other deficiencies were noted with the QC results and the data quality is acceptable.

6.3.3 Diesel Range Organics and Residual Range Organics: Because of required sample dilutions, the surrogate results were too dilute to quantitate for all eight samples and the extraction efficiency could not be determined. With this caveat noted, no other deficiencies were noted with the QC results and the data quality is acceptable.

7. EVALUATION OF THE QA LABORATORY'S DATA:

7.1 QA Laboratory Methods: The following is a listing of preparation and analytical methods used by the laboratory as reported in their data deliverable.

QA Laboratory	Parameter	Preparation Method	Analytical Method
ARDL	AVO	EPA 5030	EPA 8020
	GRO	EPA 5030	ADEC 8015 Mod.
	DRO	EPA 3550	ADEC 8100 Mod.
	RRO	EPA 3550	ADEC AK103

7.2 COC Records and SCR Forms: All COC records and sample shipping conditions, as documented on the SCR form, were evaluated according to EPA and USACE ER1110-1-263 regulations and no anomalies were noted.

7.3 Sample Holding Times, Reporting Limits, Laboratory Method Blanks, Accuracy and Precision: Sample holding times and detection/reporting limits were evaluated per EPA and ADEC criteria. The laboratory method blanks were evaluated for the absence of targeted analytes. The extraction efficiency, accuracy, and precision of the data, as represented by surrogate, MS, MSD, LC and LCD recoveries and RPD results, were compared to EPA, ADEC or LE QC acceptance limits for out of control results.

7.3.1 Aromatic Volatile Organics and Gasoline Range Organics: No deficiencies were noted in the QC results and the data quality is acceptable.

7.3.2 Diesel Range Organics and Residual Range Organics: Because of a required dilution for sample -A009SL, the DRO and RRO surrogate was too dilute to quantitate and the extraction efficiency could not be evaluated. The DRO and RRO laboratory duplicate RPD results using sample -A009SL were above the LE QC limit of 20%. The data should be considered estimates based on poorly demonstrated precision.

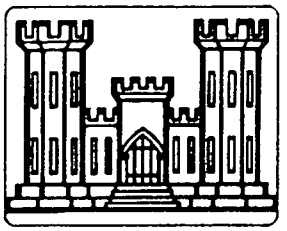
8. **COMPARISON OF THE PRIMARY AND QA LABORATORIES' DATA:** The primary and QA data comparisons are presented in the following table. The analytical results presented in the table were reviewed for agreement with each other or their respective reporting limits and evaluated for comparability. The intra- and inter-laboratory data for a sample must be within a factor of five (for soil/sediment matrices) of each other to be considered in agreement. The primary and QA laboratories' reporting limits must be within a factor of 10 to be considered comparable. Estimated data (results which have been quantified below the reporting limit and qualified with a "J" flag) should not be considered significant for the purpose of data agreement.

   All data comparisons agree with each other and are comparable with the exception of the AVO data. The benzene, toluene and total xylenes data for primary sample -A007SL and toluene datum for primary sample -A008SL should be considered tentatively identified because of the lack of reported confirmation data. With this noted, the discrepancy could not be analytically resolved as both laboratories had acceptable internal QC results. The difference between the primary and QA reporting limits is because of the use of methanolic extraction by the primary laboratory. AVO analytes were not detected above the detection limit in the original analysis of the QA sample therefore, confirmation was not required. The data for primary sample -A008SL more closely agrees with the QA data than with the blind duplicate data. The discrepancy could be due to non-identical samples submitted from the field.

TABLE I

			Primary Samples		QA Sample
Matrix: Soil		Field Identification:	96FWA007SL	96FWA008SL	96FWA009SL
Parameter	Units	Analytes Detected			
AVO	µg/Kg	Benzene	79.6	< 48.9	< 2.1
		Ethylbenzene	< 52.7	< 48.9	< 2.1
		Toluene	271	76.4	< 2.1
		Total Xylenes	241.7	< 48.9	< 2.1
GRO	mg/Kg	GRO	2.51	< 0.979	0.99 J
DRO	mg/Kg	DRO	2830	3730	4400.0
RRO	mg/Kg	RRO	6350	8020	21,000 J

µg/Kg = parts per billion (ppb)
< {reporting limit} = analyte not detected
mg/L or mg/Kg = parts per million (ppm)
J = estimated concentration



U.S. Army Corps of Engineers
North Pacific Division Laboratory
Troutdale, Oregon

Chemical Quality Assurance Report

OU-5 Data Gaps
(Bldg 1565 & Wood Stave Pipe Inv.)
Ft. WW

NPDL Work Order Number: 96-0380

Prepared for: **Alaska District**

Approved by: Albert E Hansen Jr.
for PAMELA D. HERTZBERG, Chief
Project Management and Data Evaluation Branch

CHEMICAL QUALITY ASSURANCE REPORT

OU-5 DATA GAPS (BLDG 1565 & WOOD STAVE PIPE INV.) FT. WW

1. SUMMARY:

1.1 The detected results of di-n-butylphthalate and butylbenzylphthalate in one report should be considered attributable laboratory contamination. The detected aromatic volatile organics (AVO) results of six samples should be considered estimates as the extraction efficiency was not determined. Based on out of control quality control (QC) data, the diesel range organics (DRO) results of 12 soil samples should be considered estimates. The blind duplicate comparison of gasoline range organics (GRO) in Table IV did not agree and could not be resolved.

1.2 The primary and quality assurance (QA) data comparisons are presented in Tables II through V. All data agree with each other and are comparable except for the total xylenes comparison in Table III. Refer to section 8 and the table for details.

2. BACKGROUND:

The project samples were collected September 21 through 25, 27 28 and October 3, 1996 and received by the analytical laboratories September 23, 25 through 28, 30 and October 5, 1996.

3. OBJECTIVES:

3.1 Thirty-one water samples (including four blind duplicate), 26 soil samples (including two blind duplicate) and six sediment samples were collected to determine the extent of the chemical contamination on the site. Three trip blank samples were collected to assess field contamination during sample shipment and storage.

3.2 One QA water, two soil and one trip blank samples were submitted to evaluate the primary laboratories' data.

4. PROJECT ORGANIZATION:

4.1 The project samples were collected by Harding Lawson Associates, Anchorage, Alaska.

4.2 The primary samples were analyzed by Analytica Alaska, Inc. (AAI), Anchorage, Alaska and Analytica Environmental Laboratories (AEL), Golden, Colorado.

4.3 The QA samples were analyzed by Applied Research & Development Laboratory, Inc. (ARDL), Mt. Vernon, Illinois.

5. ANALYTICAL REFERENCES:

Number	Title	Date
SW-846, Third Edition	Test Methods for Evaluating Solid Waste - Final Update II	1/95
ADEC UST Regulations, 18 AAC 78	Interim Analytical Methods for Petroleum Compounds in Soil and Water	2/92
ADEC UST Regulations, 18 AAC 78, Appendices D, E & F	Analytical Methods for Petroleum Compounds in Soil and Water	11/95

6. EVALUATION OF THE PRIMARY LABORATORIES' DATA:

6.1 Primary Laboratory Methods: The following is a listing of preparation and analytical methods used by the laboratory as reported in their data deliverable.

Primary Laboratory	Parameter (Matrix)	Preparation Method	Analytical Method
AAI	AVO (w/s)	EPA 5030	EPA 8020
	GRO (w)	EPA 5030	ADEC AK101
	GRO (s)	EPA 5030	ADEC 8015 Mod.
	DRO (s)	EPA 3550	ADEC 8100 Mod.
AEL	VOC (w)	method	EPA 8260
	BNA (w)	EPA 3520 Mod.	EPA 8270A

6.2 Chain of Custody Records and Sample Cooler Receipt Forms: All chain of custody (COC) records and sample shipping conditions, as documented on the sample cooler receipt (SCR) form, were evaluated according to EPA and U.S. Army Corps of Engineers (USACE) ER 1110-1-263 regulations. No COC discrepancies or SCR delinquencies were noted.

6.3 Trip Blank Results: The trip blank data are presented in Tables I-a and I-b. The absence of targeted volatiles indicates that cross-contamination during sample shipment and storage was unlikely.

6.4 Sample Holding Times, Reporting Limits, Laboratory Method Blanks, Accuracy and Precision: Sample holding times and detection/reporting limits were evaluated per EPA or State of Alaska Department of Environmental Conservation (ADEC) criteria. The laboratory method blanks were evaluated for the absence of targeted analytes. The extraction efficiency, accuracy and precision of the data, as represented by surrogate, matrix spike (MS), matrix spike duplicate (MSD), laboratory control (LC) and laboratory control duplicate (LCD) recoveries and relative percent difference (RPD) results, were compared to EPA, ADEC or laboratory established (LE) quality control (QC) acceptance limits for out of control results.

6.4.1 Volatile Organic Compounds (VOC): There were no anomalies noted in the QC data of the water samples and the data quality is acceptable.

6.4.2 Semi-volatile Organic Compounds (BNA): Di-n-butylphthalate and butylbenzylphthalate were detected at estimated concentrations in the water method blank of AEL report 96-10-049. The results of these two analytes should be considered attributable laboratory contamination where detected as the results were less than 10 times the level in the method blank.

6.4.3 Aromatic Volatile Organics (AVO): There were no anomalies noted in the QC data of the water samples and the data quality is acceptable. Because of a high concentration of AVO and/or GRO in six soil samples (96FWB-002SL, -003SL, -006SL, -007SL, -009SL and -023SL), the samples required a dilution prior to analysis and the surrogate was too dilute to quantify. As the surrogate recovery result was unavailable, the extraction efficiency was not determined and the detected AVO results should be considered as estimates. The laboratory reported that confirmation analysis was done when appropriate.

6.4.4 Gasoline Range Organics (GRO): There were no anomalies noted in the QC data of the water samples and the data quality is acceptable. Because of a high concentration of GRO in six samples (96FWB-002SL, -003SL, -006SL, -007SL, -009SL and -023SL), the samples required a dilution prior to analysis and one of two surrogates was either out of control or too dilute to quantify. The extraction efficiency of these samples is acceptable based on the one in control surrogate recovery.

6.4.5 Diesel Range Organics (DRO): Because of a high concentration of DRO in sample -002SL, the sample required a dilution prior to analysis, the surrogate was too dilute to quantify and the extraction efficiency of this sample was not determined. The MS and MSD recoveries in AAI report A6-09-069 were below the lower LE QC limit of 50% and the corresponding RPD result was above 20%. The MS/MSD RPD result in AAI report A6-09-081 was above the LE QC limit. Based on the reported variability, the precision of the associated soil DRO results in these two reports (12 soil samples) is marginal and the data should be considered as estimates.

6.5 Field Blind Duplicate Results: The field blind duplicate results are presented in Tables II through VIII. All data agree except for the GRO comparison in Table IV. Since the laboratory had acceptable internal QC data, the discrepancy could not be analytically resolved.

6.6 Overall Evaluation of the Primary Laboratories' Data: The detected results of di-n-butylphthalate and butylbenzylphthalate in AEL report 96-10-049 should be considered attributable laboratory contamination. The detected AVO results of six samples (96FWB-002SL, -003SL, -006SL, -007SL, -009SL and -023SL), should be considered estimates as the extraction efficiency was not determined. Based on the variability of the DRO matrix spike data in AAI reports A6-09-069 and A6-09-081, the precision of the associated soil DRO results is marginal and the data should be considered estimates. The blind duplicate comparison of GRO in Table IV did not agree and could not be resolved.

7. EVALUATION OF THE QA LABORATORY'S DATA:

7.1 QA Laboratory Methods: The following is a listing of preparation and analytical methods used by the laboratory as reported in their data deliverable.

QA Laboratory	Parameter (Matrix)	Preparation Method	Analytical Method
ARDL	AVO (w/s)	EPA 5030	EPA 8020
	GRO (w/s)	EPA 5030	ADEC 8015 Mod.
	DRO (s)	EPA 3550	ADEC 8100 Mod.

7.2 COC Records and SCR Forms: All COC records and sample shipping conditions, as documented on the SCR form, were evaluated according to EPA and USACE ER1110-1-263 regulations and the following notations made. One of three sample vials for GRO sample -008WA had an air bubble. The correction on the COC record was not

dated (see report 9484). The date of collection for sample -018SL (9-29-96) was incorrect and should have been listed on the COC record as 9-24-96 (see report 9496).

7.3 Trip Blank Results: The trip blank data are presented in Table I-a. The absence of targeted volatiles indicates that cross-contamination during sample shipment and storage was unlikely.

7.4 Sample Holding Times, Reporting Limits, Laboratory Method Blanks, Accuracy and Precision: Sample holding times and detection/reporting limits were evaluated per EPA or ADEC criteria. The laboratory method blanks were evaluated for the absence of targeted analytes. The extraction efficiency, accuracy, and precision of the data, as represented by surrogate, MS, MSD, LC and LCD recoveries and RPD results, were compared to EPA, ADEC or LE QC acceptance limits for out of control results.

7.4.1 AVO: The surrogate recovery of water sample -008WA was above the upper LE QC limit. The laboratory analyzed the sample twice with similar results, indicating matrix interference. Based on a high surrogate recovery, the detected total xylenes datum of sample -008SL should be considered a high estimate. One of four soil LC recoveries (batch 1021KM2 of report 9496) was slightly above the LE QC limit and the LC data is accepted based on the remaining recoveries. The laboratory reported that confirmation analysis was done when appropriate.

7.4.2 GRO: Soil sample -008SL was re-analyzed two days past holding time because of a high GRO concentration in the sample. Based on holding time expiration, the GRO datum of sample -008SL should be considered an estimate. Because of a high concentration of GRO in sample -008SL, the sample required a dilution prior to analysis and the surrogate was too dilute to quantify. As the surrogate recovery result was unavailable, the extraction efficiency was not determined. The soil MSD recovery (using sample -018SL) in report 9496 was slightly above the ADEC QC limit. The accuracy of the associated data is acceptable based on the remaining MS and LC/LCD recoveries within QC limits.

7.4.3 DRO: Because of a high concentration of DRO in sample -008SL, the sample required a dilution prior to analysis and the surrogate was too dilute to quantify. As the surrogate recovery result was unavailable, the extraction efficiency was not determined.

8. **COMPARISON OF THE PRIMARY AND QA LABORATORIES' DATA:** The primary and QA data comparisons are presented in Tables II through V. The analytical results presented in each table were reviewed for agreement with each other or their respective reporting limits and evaluated for comparability. The intra- and inter-laboratory data for a sample must be within a factor of three (for water matrices) and five (for soil/sediment matrices) of each other to be considered in agreement. The primary and QA laboratories' reporting limits must be within a factor of 10 to be considered comparable. Estimated data (results which have been quantified below the reporting limit and qualified with a "J" flag) should not be considered significant for the purpose of data agreement. All data agree with each other and are comparable except for the total xylenes comparison in Table III. The primary laboratory reported acceptable internal QC data and the QA datum should be considered a high estimate based on a high sample surrogate recovery. It should be noted that both laboratories confirmed their data by secondary analysis.

TABLE I-a Trip Blank

Matrix: Water		Field Identification:	Primary Samples		QA Sample
		Date:	96FWB-013WA 9/22/96	96FWB-028WA 9/27/96	96FWB-014WA 9/22/96
Parameter	Units	Analytes Detected			
AVO	µg/L	Benzene	< 1.0	< 1.0	< 2.0
		Toluene	< 1.0	< 1.0	< 2.0
		Ethylbenzene	< 1.0	< 1.0	< 2.0
		Total Xylenes	< 1.0	< 1.0	< 2.0
GRO	µg/L	GRO	< 100	< 100	< 100

Comments: The absence of targeted volatiles indicates that cross-contamination during sample shipment and storage was unlikely.

TABLE I-b Trip Blank

Matrix: Water		Field Identification:	Primary Sample
		Date:	96FWB-030WA 10/03/96
Parameter	Units	Analytes Detected	
VOC	µg/L		< [1.0-50]

Comments: The absence of targeted volatiles indicates that cross-contamination during sample shipment and storage was unlikely.

µg/L or µg/Kg = parts per billion (ppb)
< {reporting limit} = analyte not detected
B = detected in method blank

mg/L or mg/Kg = parts per million (ppm)
J = estimated concentration
C = confirmed by secondary analysis

TABLE II

			Primary Samples		QA Sample
Matrix: Water		Field Identification:	96FWB-006WA	96FWB-007WA	96FWB-008WA
Parameter	Units	Analytes Detected			
AVO	µg/L	Benzene	< 5.0	< 2.0	< 2.0
		Toluene	< 5.0	6.1	4.1
		Ethylbenzene	15	14	8.6
		Total Xylenes	130	120	58.3
GRO	µg/L	GRO	2900	3800	3000

Comments: The data agree.

TABLE III

			Primary Samples		QA Sample
Matrix: Soil		Field Identification:	96FWB-006SL	96FWB-007SL	96FWB-008SL
Parameter	Units	Analytes Detected			
AVO	mg/Kg	Benzene	< 0.88	< 1.8	< 2.02
		Toluene	< 0.88	< 1.8	< 2.02
		Ethylbenzene	< 0.88	< 1.8	< 2.02
		Total Xylenes	< 0.88	< 1.8	25.0
GRO	mg/Kg	GRO	1500	1900	676
DRO	mg/Kg	DRO	8800	23,000	5100

Comments: The primary and QA comparison of total xylenes does not agree. See section 8 for detail.

TABLE IV

			Primary Samples		QA Sample
Matrix: Soil		Field Identification:	96FWB-016SL	96FWB-017SL	96FWB-018SL
Parameter	Units	Analytes Detected			
AVO	mg/Kg	Benzene	< 0.026	< 0.024	< 0.0033
		Toluene	< 0.026	< 0.024	< 0.0033
		Ethylbenzene	< 0.026	< 0.024	< 0.0033
		Total Xylenes	< 0.026	< 0.024	< 0.0033
GRO	mg/Kg	GRO	13	< 2.4	3.3 J
DRO	mg/Kg	DRO	33	25	20

Comments: The field blind duplicate comparison of GRO does not agree. See section 6.5 for detail.

µg/L or µg/Kg = parts per billion (ppb)
< {reporting limit} = analyte not detected
B = detected in method blank

mg/L or mg/Kg = parts per million (ppm)
J = estimated concentration
C = confirmed by secondary analysis

TABLE V

Matrix: Water		Field Identification:	Primary Samples 96FWB-016WA	96FWB-017WA
Parameter	Units	Analytes Detected		
AVO	µg/L	Benzene	< 20	< 20
		Toluene	< 20	29
		Ethylbenzene	55	89
		Total Xylenes	600	980
GRO	µg/L	GRO	9600	16,000

Comments: The data agree.

TABLE VI

Matrix: Water		Field Identification:	Primary Samples 96FWB-022WA	96FWB-023WA
Parameter	Units	Analytes Detected		
AVO	µg/L	Benzene	< 1.0	< 1.0
		Toluene	< 1.0	< 1.0
		Ethylbenzene	< 1.0	< 1.0
		Total Xylenes	< 1.0	< 1.0
GRO	µg/L	GRO	< 100	< 100

Comments: The data agree.

TABLE VII

Matrix: Sediment		Field Identification:	Primary Samples 96FWB-032SD	96FWB-033SD
Parameter	Units	Analytes Detected		
AVO	mg/Kg	Benzene	< 0.035	< 0.035
		Toluene	< 0.035	< 0.035
		Ethylbenzene	< 0.035	< 0.035
		Total Xylenes	< 0.035	< 0.035
GRO	mg/Kg	GRO	< 3.5	< 3.5
DRO	mg/Kg	DRO	51	50

Comments: The data agree.

µg/L or µg/Kg = parts per billion (ppb)
< {reporting limit} = analyte not detected
B = detected in method blank

mg/L or mg/Kg = parts per million (ppm)
J = estimated concentration
C = confirmed by secondary analysis

TABLE VIII

Matrix: Water		Field Identification:	Primary Samples 96FWB-032WA	96FWB-033WA
Parameter	Units	Analytes Detected		
VOC	µg/L	Toluene	3.7	3.0
		Ethylbenzene	45	45
		m,p-Xylenes	350	350
		o-Xylene	55	49
		1,3,5-Trimethylbenzene	6.5	6.9
		1,2,4-Trimethylbenzene	27	27
		Isopropylbenzene	< 2.0	2.4
		Naphthalene	3.8 J	3.4 J
		4-Methyl-2-pentanone	81	58
BNA	µg/L	Naphthalene	2.0 J	2.6 J
		2-Methylnaphthalene	< 10	1.0 J
		Acenaphthene	2.2 J	2.4 J
		Fluorene	1.5 J	1.7 J
		Phenanthrene	3.9 J	4.6 J
		Fluoranthene	1.5 J	2.3 J
		Pyrene	1.5 J	2.2 J
		Di-n-butylphthalate	1.7 J,B	< 10
		Butylbenzylphthalate	2.9 J,B	< 1.9 J,B

Comments: The data agree.

µg/L or µg/Kg = parts per billion (ppb)
< {reporting limit} = analyte not detected
B = detected in method blank
mg/L or mg/Kg = parts per million (ppm)
J = estimated concentration
C = confirmed by secondary analysis

9. PROBLEMS ENCOUNTERED\CORRECTIVE ACTIONS TAKEN:

9.1 The BNA extraction procedure discussed in AEL report 96-10-049 is a modification of EPA 3520 (liquid-liquid extraction). The laboratory reported that a single 18 hour extraction at a pH of less 2 was performed instead of the method specified dual extraction at two pH values (>11 and <2). The laboratory reported acceptable base-neutral surrogate and spike recoveries and the data quality appears unaffected by the single extraction modification.

9.2 Due to a lack of approved funding, two QA sample shipments were held at CENPP-PE-L and ultimately canceled. The COC records, SCR forms and CENPP-PE-L hold statements for these shipments are included as enclosures.

FILE COPY

CENPA-EN-G-MI (200-1c) 14 February 1997

MEMORANDUM THROUGH Chief, CENPA-EN-G
Chief, CENPA-EN-G-MI

FOR RECORD

SUBJECT: Chemical Data Quality Assessment Report, Magnetic Anomaly, OU5, Ft. Wainwright, Alaska

1. Reference memorandum CENPP-PE-L dated 9 Jan 97, subject: W.O. 96-0379, Results of Chemical Analysis, OU-5 Magnetic Anomaly, Test Pits, Ft. WW..

2. **Summary**: The referenced memorandum is enclosed. The Quality Assurance Report (QAR) summarizes data quality for the subject project. The contractor's laboratory met all requirements for data quality. Data are usable for site characterization purposes.

3. **Background**: Magnetic anomalies had been noted at Operable Unit 5 (OU5) sites during a previous geophysical investigation. Test pits were excavated and sampled to determine if soil contamination and/or buried drums were present at the indicated anomalies.

4. **Data Quality Objectives**: Data will be used to assess current site conditions. Data will be compared to regulatory limits in the Alaska Department of Environmental Conservation matrix score sheet. Data quality must be adequate for these uses.

5. **Chemical Data Quality Assessment**: No significant deficiencies were noted.

Mollie Tevrucht

MOLLIE TEVRUCHT
Senior Chemist

encl

CF w/encl: CENPA-EN-EE-AI
w/o encl: CEMRO-HX-C

FILE COPY

CENPA-EN-G-MI 4 February 1997

MEMORANDUM THROUGH CENPA-EN-G DM
CENPA-EN-G-MI

FOR RECORD

SUBJECT: Chemical Data Quality Assessment Report, Data Gaps, OU5, Ft. Wainwright, AK

1. Reference memorandum CENPP-PE-L dated 31 Dec 96, subject: W.O. 96-0380, Results of Chemical Analysis, OU-5 Data Gaps (Bldg. 1565 & Wood Stave Pipe Inv.) Ft. WW.

2. **Summary:** The referenced memorandum is enclosed. The Quality Assurance Report (QAR) summarizes data quality for samples collected in support of a risk assessment for OU5 on Fort Wainwright, Alaska. Contract requirements for data quality were met, except for twelve samples tested for diesel range organics (DRO). In general, data are usable for risk assessment purposes.

3. **Background:** Additional sampling was required at Building 1565 and the wood stave pipe area to fill in data gaps for OU5.

4. **Data Quality Objectives:** Data must be of adequate quality to support a risk assessment.

5. **Chemical Data Quality Assessment:**

a. The detections of di-n-phthalate and butylbenzylphthalate are due to laboratory contamination.

b. The diesel range organics data for 12 soil samples should be flagged as estimated, due to internal laboratory QC failure.

c. Selected QA samples were not analyzed, because FY97 funding was not available until after the holding times had expired. The samples were discarded by the laboratory.

Mollie Tevrucht

encl MOLLIE TEVRUCHT
Senior Chemist

CF w/encl: CENPA-EN-EE-AI
w/o encl: CEMRO-HX-C

APPENDIX F

APPENDIX F

PHOTOGRAPHIC LOG

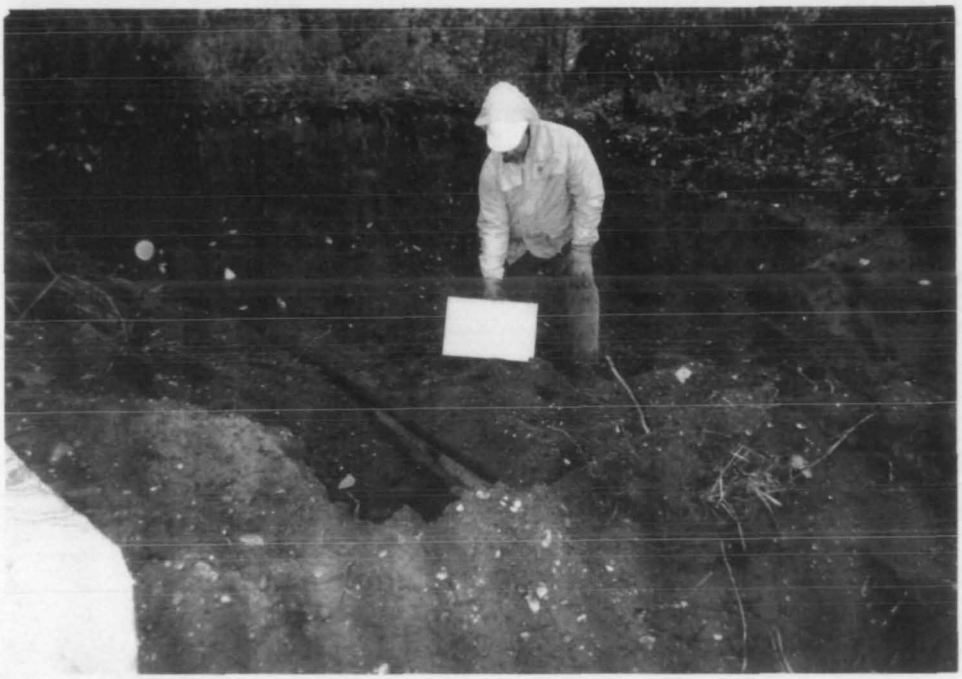


Photo 1. Test pit A facing north showing the limits of excavation and a portion of the suspected boiler manifold exposed during excavation.

Photo 2. Test pit A facing east showing the suspected boiler manifold.

Harding Lawson Associates Engineering and Environmental Services	ALASKA DISTRICT CORPS OF ENGINEERS ANCHORAGE, ALASKA	APPROVED: JED DRAWN: JP JOB NO. 32523 DATE: 3/97	**Photographic Log** Operable Unit 5 Fort Wainwright, Alaska

691j

Photo 3. Test pit B area facing north before excavation.

Photo 4. Test pit B after excavation. Steel plate is shown on the plastic sheeting in the background.

Harding Lawson Associates Engineering and Environmental Services	ALASKA DISTRICT CORPS OF ENGINEERS ANCHORAGE, ALASKA	APPROVED: JED DRAWN: JP JOB NO. 32523 DATE: 3/97	**Photographic Log** Operable Unit 5 Fort Wainwright, Alaska

691j

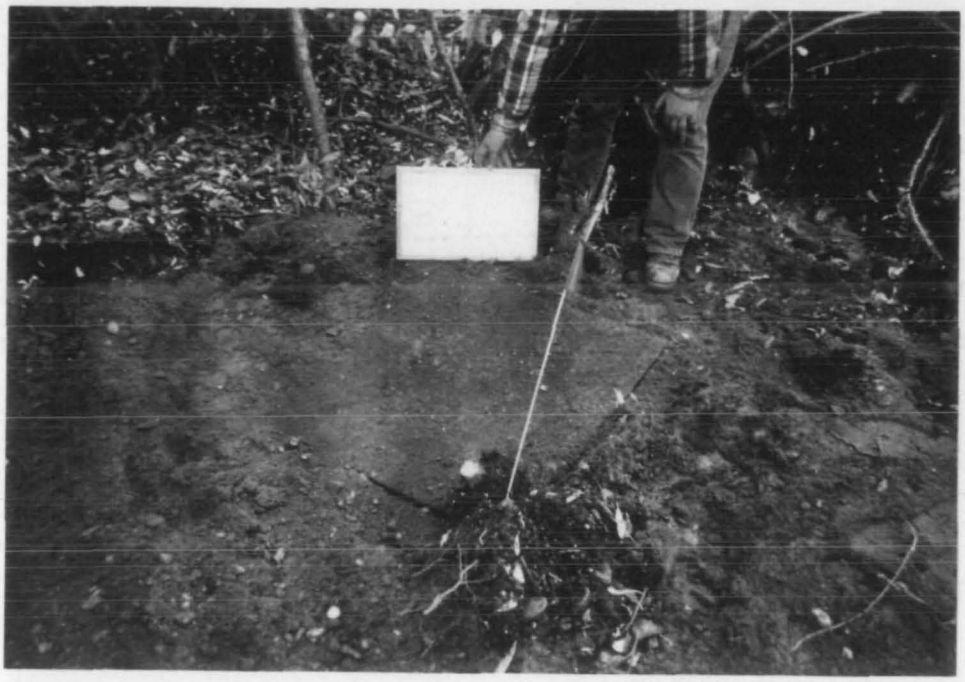


Photo 5. Test pit C, steel plate exposed and removed from excavation.

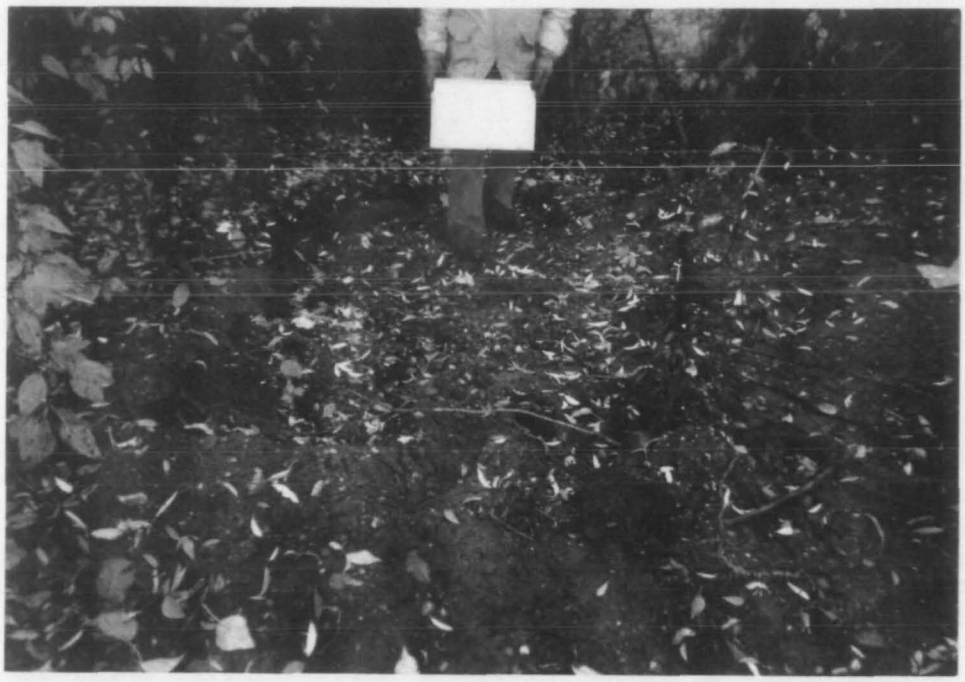


Photo 6. Test pit C limits of excavation.

Harding Lawson Associates Engineering and Environmental Services	ALASKA DISTRICT CORPS OF ENGINEERS ANCHORAGE, ALASKA	APPROVED: JEP DRAWN: JP JOB NO. 32523 DATE: 3/97	**Photographic Log** Operable Unit 5 Fort Wainwright, Alaska

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Photo 7. Test pit D area facing north before excavation.

Photo 8. Test pit D, 6-inch by 10-inch metal plates exposed and removed during excavation.

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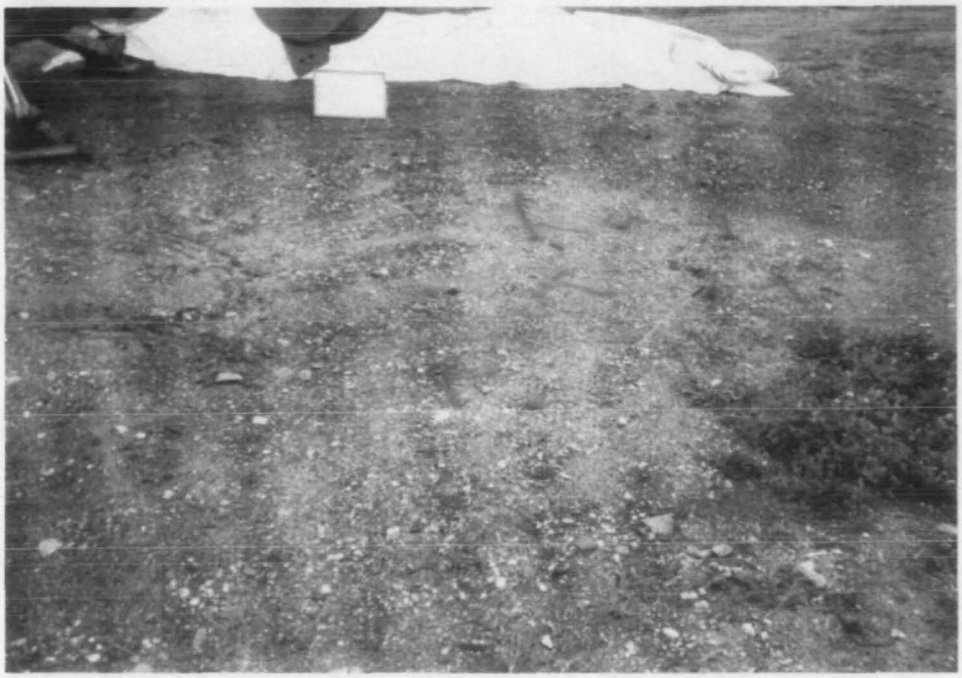

Photo 9. Test pit E – F area facing north before excavation.

Photo 10. Test pit E – F facing north showing a thin metal sheet exposed and removed during excavation.

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Photo 11. Test pit G showing railroad rails exposed during excavation.

Photo 12. Test pit G facing east showing railroad rail with asphalt/tar/aggregate mixture attached.

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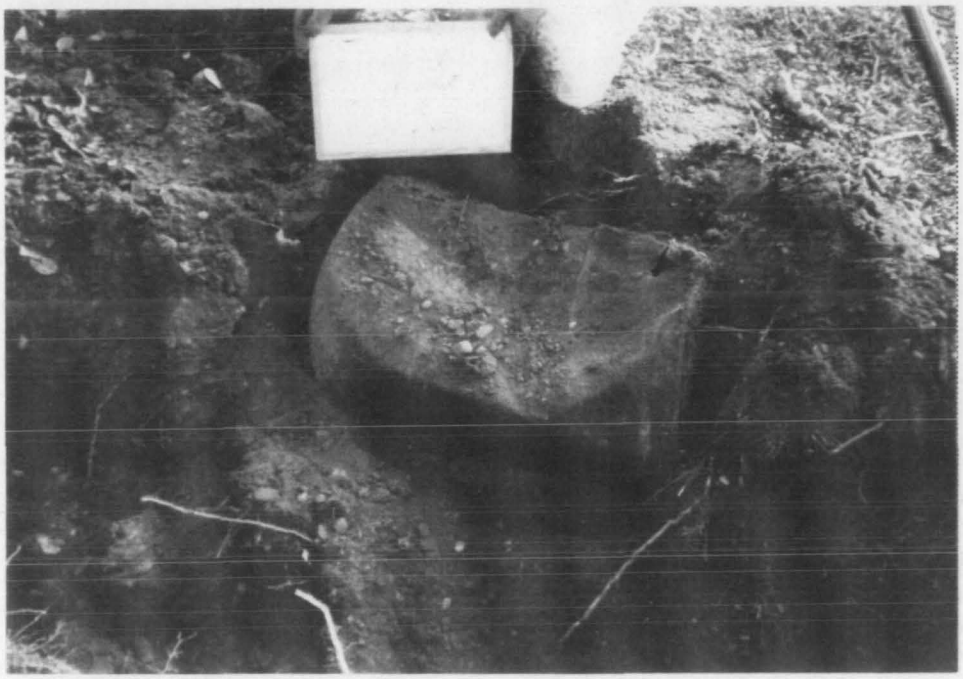

Photo 13. Test pit H showing drum (1/3 full of soil/tar mixture) exposed during excavation.

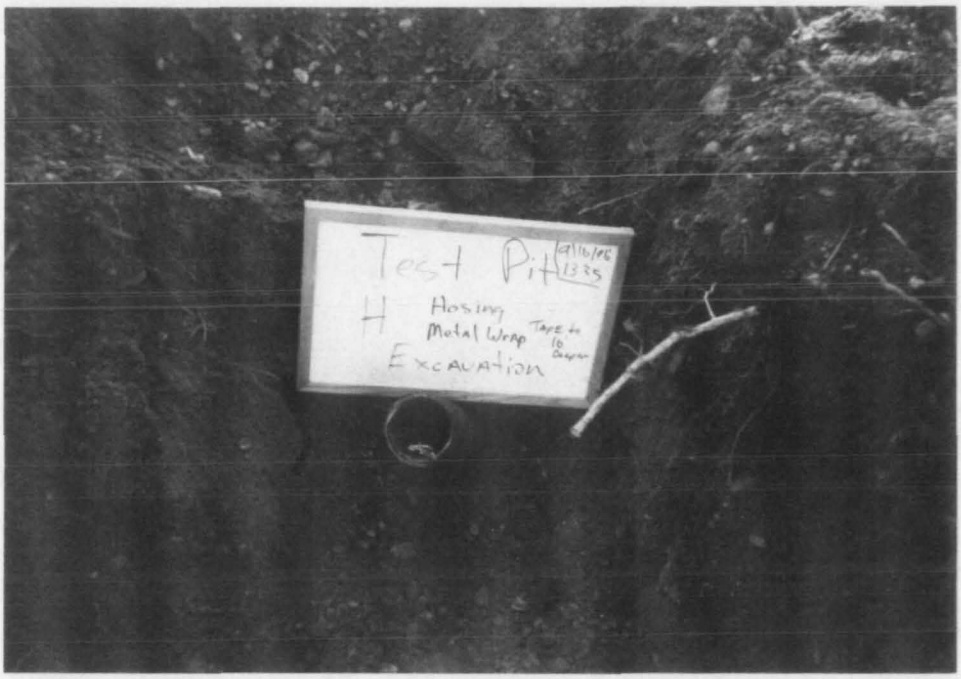

Photo 14. Test pit H showing 3 inch diameter metal wrap hose exposed and left in place at the limits of excavation.

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Photo 15. Test pit I showing thin tar-coated metal sheeting exposed and removed during excavation.

Photo 16. Test pit I showing soft tar mixed with soil exposed and left in place during excavation and tar-coated metal sheeting left in place.

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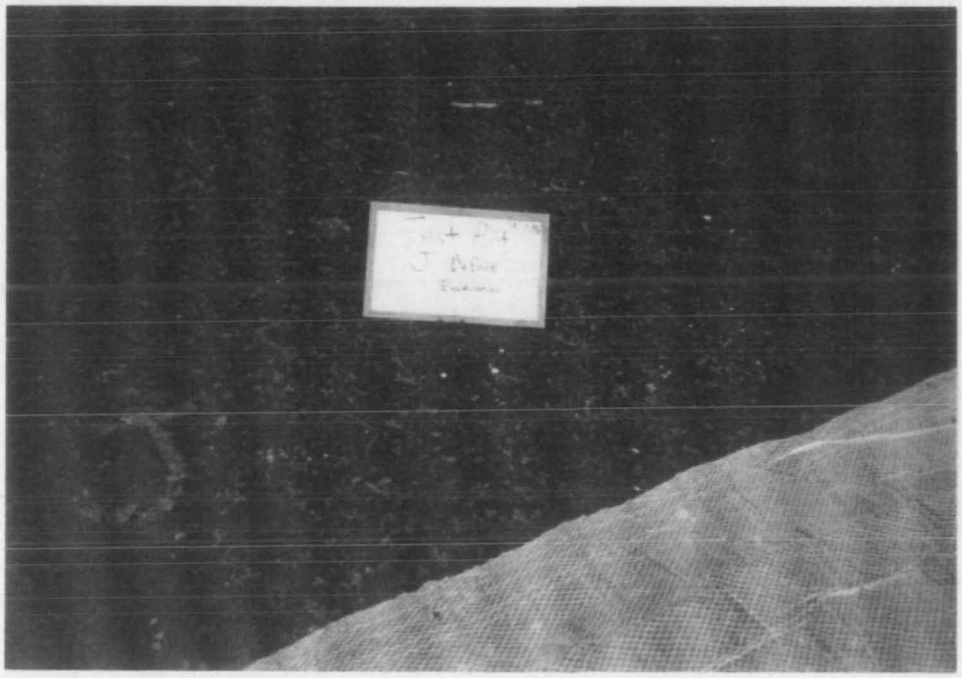

Photo 17. Test pit J area facing north before excavation.

Photo 18. Test pit J showing smashed drum, with tar residue, removed from excavation.

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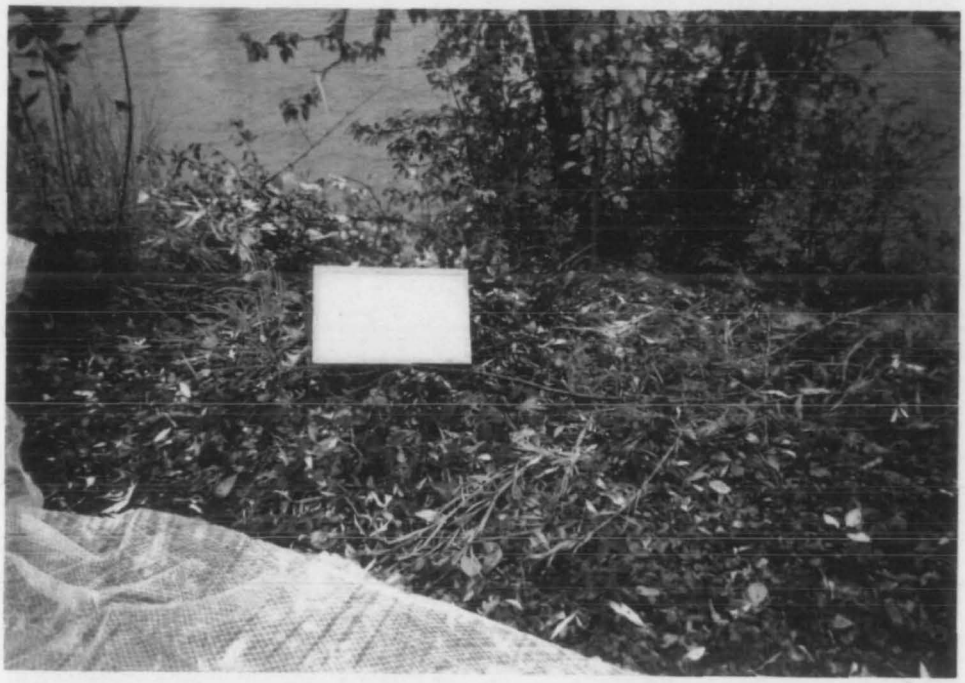

Photo 19. Test pit K area facing north before excavation.

Photo 20. Test pit K showing remains of a drum and tar clump exposed and removed during excavation.

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Photo 21. Test pit L area facing north before excavation.

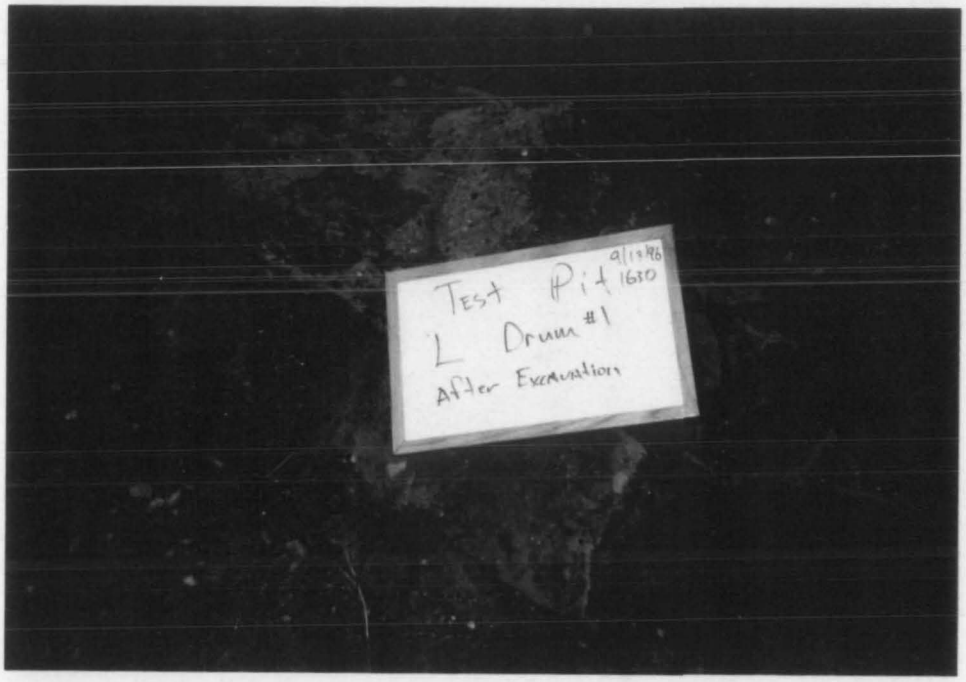

Photo 22. Test pit L, drum exposed and removed during excavation.

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Photo 23. Test pit M area facing east before excavation.

Photo 24. Test pit M facing east after excavation.

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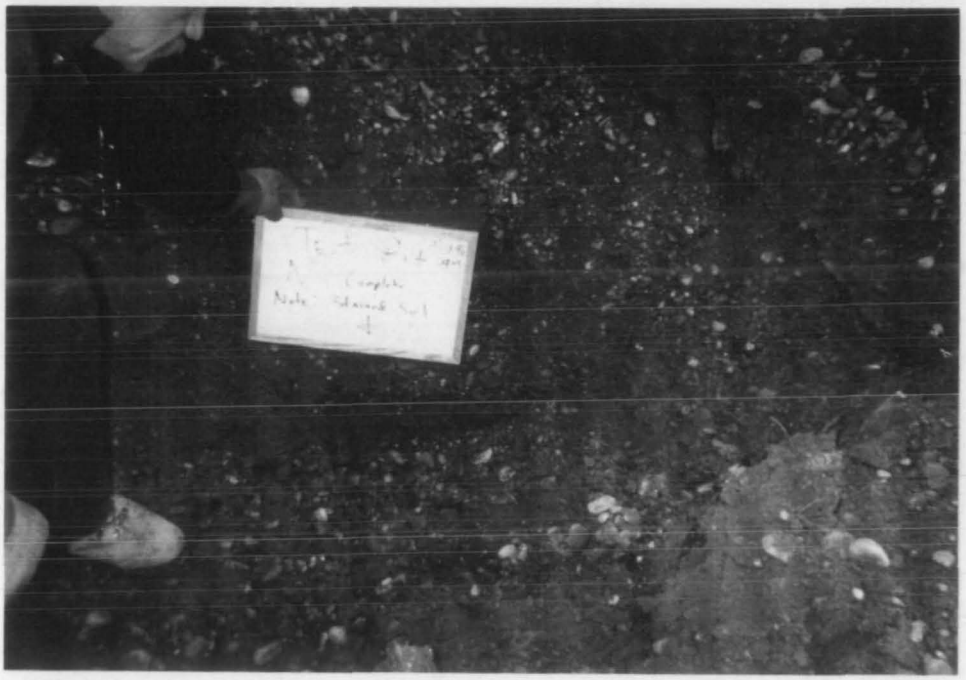

Photo 25. Test pit N showing tar stained soil exposed and removed during excavation.

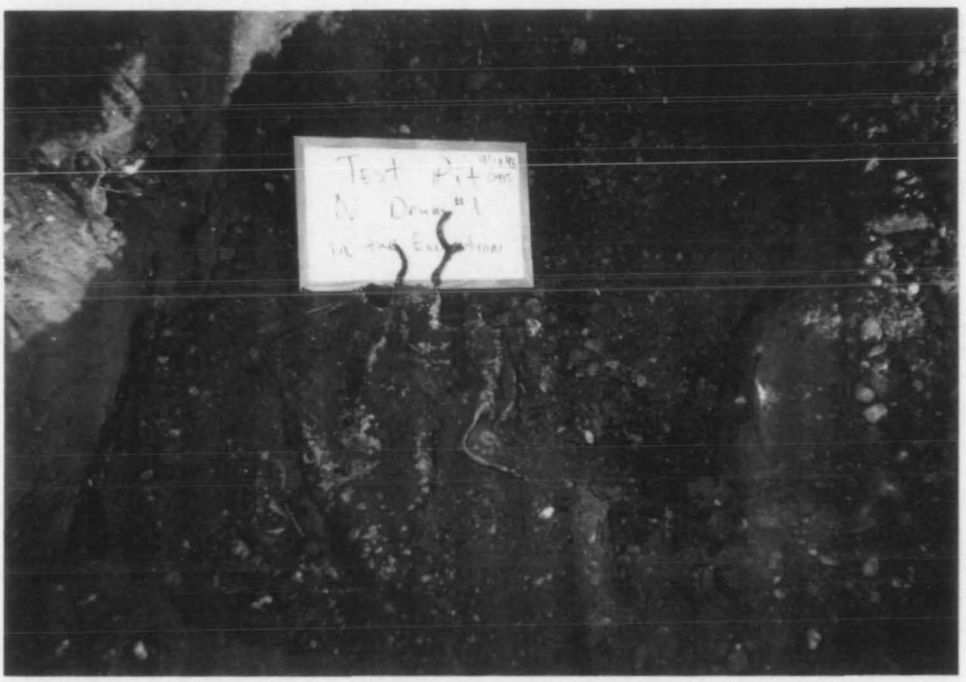

Photo 26. Test pit N showing drum with water/tar mixture exposed and removed during excavation.

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Photo 27. Test pit O showing drum with tar/soil/water mixture exposed and removed during excavation.

Photo 28. Test pit P showing drum exposed and removed during excavation.

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Photo 29. Test pit P showing drum removed from excavation.

Photo 30. Test pit P showing drum removed from excavation and placed in an 85 gallon overpack drum.

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Photo 31. Test pit "Unnamed" showing drum exposed and removed from excavation.

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APPENDIX G

APPENDIX G

SUMMARY OF ANALYTICAL RESULTS

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
Airfield Pipeline Site

HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB001WA	A609061-01A	PS-4	20	PR	AK101	Gasoline Range Organics (C6 - C10)	21000	=	2000	UG/L		
96FWB001WA	A609061-01A	PS-4	20	PR	SW8020	Benzene	0	ND	20	UG/L		
96FWB001WA	A609061-01A	PS-4	20	PR	SW8020	Ethylbenzene	760	=	20	UG/L		
96FWB001WA	A609061-01A	PS-4	20	PR	SW8020	Toluene	290	=	20	UG/L		
96FWB001WA	A609061-01A	PS-4	20	PR	SW8020	Xylenes	4600	=	20	UG/L		
96FWB002WA	A609061-02A	PS-5	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB002WA	A609061-02A	PS-5	20	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB002WA	A609061-02A	PS-5	20	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB002WA	A609061-02A	PS-5	20	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB002WA	A609061-02A	PS-5	20	PR	SW8020	Xylenes	0	ND	1	UG/L		
96FWB003WA	A609061-03A	PS-6	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB003WA	A609061-03A	PS-6	20	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB003WA	A609061-03A	PS-6	20	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB003WA	A609061-03A	PS-6	20	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB003WA	A609061-03A	PS-6	20	PR	SW8020	Xylenes	0	ND	1	UG/L		
96FWB004WA	A609061-04A	PS-7	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB004WA	A609061-04A	PS-7	20	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB004WA	A609061-04A	PS-7	20	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB004WA	A609061-04A	PS-7	20	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB004WA	A609061-04A	PS-7	20	PR	SW8020	Xylenes	0	ND	1	UG/L		
96FWB005WA	A609061-05A	PS-8	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB005WA	A609061-05A	PS-8	20	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB005WA	A609061-05A	PS-8	20	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB005WA	A609061-05A	PS-8	20	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB005WA	A609061-05A	PS-8	20	PR	SW8020	Xylenes	0	ND	1	UG/L		
96FWB006WA	A609061-06A	PS-4	30	PR	AK101	Gasoline Range Organics (C6 - C10)	2900	=	500	UG/L		
96FWB006WA	A609061-06A	PS-4	30	PR	SW8020	Benzene	0	ND	5	UG/L		
96FWB006WA	A609061-06A	PS-4	30	PR	SW8020	Ethylbenzene	15	=	5	UG/L		
96FWB006WA	A609061-06A	PS-4	30	PR	SW8020	Toluene	0	ND	5	UG/L		
96FWB006WA	A609061-06A	PS-4	30	PR	SW8020	Xylenes	130	=	5	UG/L		
96FWB007WA	A609061-07A	PS-4	30	QC	AK101	Gasoline Range Organics (C6 - C10)	3800	=	200	UG/L		
96FWB007WA	A609061-07A	PS-4	30	QC	SW8020	Benzene	0	ND	2	UG/L		
96FWB007WA	A609061-07A	PS-4	30	QC	SW8020	Ethylbenzene	14	=	2	UG/L		
96FWB007WA	A609061-07A	PS-4	30	QC	SW8020	Toluene	6.1	=	2	UG/L		
96FWB007WA	A609061-07A	PS-4	30	QC	SW8020	Xylenes	120	=	2	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
Airfield Pipeline Site

HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB009WA	A609061-08A	PS-4	40	PR	AK101	Gasoline Range Organics (C6 - C10)	2400	=	500	UG/L		
96FWB009WA	A609061-08A	PS-4	40	PR	SW8020	Benzene	0	ND	5	UG/L		
96FWB009WA	A609061-08A	PS-4	40	PR	SW8020	Ethylbenzene	0	ND	5	UG/L		
96FWB009WA	A609061-08A	PS-4	40	PR	SW8020	Toluene	0	ND	5	UG/L		
96FWB009WA	A609061-08A	PS-4	40	PR	SW8020	Xylenes	61	=	5	UG/L		
96FWB010WA	A609061-09A	PS-4	50	PR	AK101	Gasoline Range Organics (C6 - C10)	690	=	100	UG/L		
96FWB010WA	A609061-09A	PS-4	50	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB010WA	A609061-09A	PS-4	50	PR	SW8020	Ethylbenzene	1.1	=	1	UG/L		
96FWB010WA	A609061-09A	PS-4	50	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB010WA	A609061-09A	PS-4	50	PR	SW8020	Xylenes	7	=	1	UG/L		
96FWB011WA	A609061-10A	PS-4	60	PR	AK101	Gasoline Range Organics (C6 - C10)	320	=	100	UG/L		
96FWB011WA	A609061-10A	PS-4	60	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB011WA	A609061-10A	PS-4	60	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB011WA	A609061-10A	PS-4	60	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB011WA	A609061-10A	PS-4	60	PR	SW8020	Xylenes	2.7	=	1	UG/L		
96FWB012WA	A609061-11A	PS-4	70	PR	AK101	Gasoline Range Organics (C6 - C10)	270	=	100	UG/L		
96FWB012WA	A609061-11A	PS-4	70	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB012WA	A609061-11A	PS-4	70	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB012WA	A609061-11A	PS-4	70	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB012WA	A609061-11A	PS-4	70	PR	SW8020	Xylenes	1.3	=	1	UG/L		
96FWB013WA	A609061-12A			PRTB	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB013WA	A609061-12A			PRTB	SW8020	Benzene	0	ND	1	UG/L		
96FWB013WA	A609061-12A			PRTB	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB013WA	A609061-12A			PRTB	SW8020	Toluene	0	ND	1	UG/L		
96FWB013WA	A609061-12A			PRTB	SW8020	Xylenes	0	ND	1	UG/L		
96FWB015WA	A609089-01A	PS-11	20	PR	AK101	Gasoline Range Organics (C6 - C10)	2500	=	500	UG/L		
96FWB015WA	A609089-01A	PS-11	20	PR	SW8020	Benzene	0	ND	5	UG/L		
96FWB015WA	A609089-01A	PS-11	20	PR	SW8020	Ethylbenzene	41	=	5	UG/L		
96FWB015WA	A609089-01A	PS-11	20	PR	SW8020	Toluene	0	ND	5	UG/L		
96FWB015WA	A609089-01A	PS-11	20	PR	SW8020	Xylenes	430	=	5	UG/L		
96FWB016WA	A609089-02A	PS-9	20	PR	AK101	Gasoline Range Organics (C6 - C10)	9600	=	2000	UG/L		
96FWB016WA	A609089-02A	PS-9	20	PR	SW8020	Benzene	0	ND	20	UG/L		
96FWB016WA	A609089-02A	PS-9	20	PR	SW8020	Ethylbenzene	55	=	20	UG/L		
96FWB016WA	A609089-02A	PS-9	20	PR	SW8020	Toluene	0	ND	20	UG/L		
96FWB016WA	A609089-02A	PS-9	20	PR	SW8020	Xylenes	600	=	20	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
Airfield Pipeline Site

HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB017WA	A609089-03A	PS-9	20	QC	AK101	Gasoline Range Organics (C6 - C10)	16000	=	2000	UG/L		
96FWB017WA	A609089-03A	PS-9	20	QC	SW8020	Benzene	0	ND	20	UG/L		
96FWB017WA	A609089-03A	PS-9	20	QC	SW8020	Ethylbenzene	89	=	20	UG/L		
96FWB017WA	A609089-03A	PS-9	20	QC	SW8020	Toluene	29	=	20	UG/L		
96FWB017WA	A609089-03A	PS-9	20	QC	SW8020	Xylenes	980	=	20	UG/L		
96FWB019WA	A609089-04A	PS-10	20	PR	AK101	Gasoline Range Organics (C6 - C10)	2600	=	200	UG/L		
96FWB019WA	A609089-04A	PS-10	20	PR	SW8020	Benzene	0	ND	2	UG/L		
96FWB019WA	A609089-04A	PS-10	20	PR	SW8020	Ethylbenzene	0	ND	2	UG/L		
96FWB019WA	A609089-04A	PS-10	20	PR	SW8020	Toluene	0	ND	2	UG/L		
96FWB019WA	A609089-04A	PS-10	20	PR	SW8020	Xylenes	3.2	=	2	UG/L		
96FWB020WA	A609089-05A	PS-12	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB020WA	A609089-05A	PS-12	20	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB020WA	A609089-05A	PS-12	20	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB020WA	A609089-05A	PS-12	20	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB020WA	A609089-05A	PS-12	20	PR	SW8020	Xylenes	0	ND	1	UG/L		
96FWB021WA	A609089-06A	PS-11	30	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB021WA	A609089-06A	PS-11	30	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB021WA	A609089-06A	PS-11	30	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB021WA	A609089-06A	PS-11	30	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB021WA	A609089-06A	PS-11	30	PR	SW8020	Xylenes	4.3	=	1	UG/L		
96FWB022WA	A609089-07A	PS-11	40	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB022WA	A609089-07A	PS-11	40	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB022WA	A609089-07A	PS-11	40	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB022WA	A609089-07A	PS-11	40	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB022WA	A609089-07A	PS-11	40	PR	SW8020	Xylenes	0	ND	1	UG/L		
96FWB023WA	A609089-08A	PS-11	40	QC	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB023WA	A609089-08A	PS-11	40	QC	SW8020	Benzene	0	ND	1	UG/L		
96FWB023WA	A609089-08A	PS-11	40	QC	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB023WA	A609089-08A	PS-11	40	QC	SW8020	Toluene	0	ND	1	UG/L		
96FWB023WA	A609089-08A	PS-11	40	QC	SW8020	Xylenes	0	ND	1	UG/L		
96FWB025WA	A609089-09A	PS-11	50	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB025WA	A609089-09A	PS-11	50	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB025WA	A609089-09A	PS-11	50	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB025WA	A609089-09A	PS-11	50	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB025WA	A609089-09A	PS-11	50	PR	SW8020	Xylenes	0	ND	1	UG/L		

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Groundwater Probe Results
Airfield Pipeline Site

HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB026WA	A609089-10A	PS-11	60	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB026WA	A609089-10A	PS-11	60	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB026WA	A609089-10A	PS-11	60	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB026WA	A609089-10A	PS-11	60	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB026WA	A609089-10A	PS-11	60	PR	SW8020	Xylenes	0	ND	1	UG/L		
96FWB027WA	A609089-11A	PS-11	70	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB027WA	A609089-11A	PS-11	70	PR	SW8020	Benzene	0	ND	1	UG/L		
96FWB027WA	A609089-11A	PS-11	70	PR	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB027WA	A609089-11A	PS-11	70	PR	SW8020	Toluene	0	ND	1	UG/L		
96FWB027WA	A609089-11A	PS-11	70	PR	SW8020	Xylenes	0	ND	1	UG/L		
96FWB028WA	A609089-12A			PRTB	AK101	Gasoline Range Organics (C6 - C10)	0	ND	100	UG/L		
96FWB028WA	A609089-12A			PRTB	SW8020	Benzene	0	ND	1	UG/L		
96FWB028WA	A609089-12A			PRTB	SW8020	Ethylbenzene	0	ND	1	UG/L		
96FWB028WA	A609089-12A			PRTB	SW8020	Toluene	0	ND	1	UG/L		
96FWB028WA	A609089-12A			PRTB	SW8020	Xylenes	0	ND	1	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,1,1,2-Tetrachloroethane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,1,1-Trichloroethane	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,1,2,2-Tetrachloroethane	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,1,2-Trichloro-1,2,2-trifluoroethane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,1,2-Trichloroethane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,1-Dichloroethane	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,1-Dichloroethene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,1-Dichloropropene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2,3-Trichlorobenzene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2,3-Trichloropropane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2,4-Trichlorobenzene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2,4-Trimethylbenzene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2-Dibromo-3-chloropropane	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2-Dibromoethane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2-Dichlorobenzene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2-Dichloroethane	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,2-Dichloropropane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,3,5-Trimethylbenzene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,3-Dichlorobenzene	0	ND	2	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	1,3-Dichloropropane	0	ND	3	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB030WA	9610049-01A			PRTB	SW8260A	1,4-Dichlorobenzene	0	ND	2	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	2,2-Dichloropropane	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	2-Butanone	0	ND	50	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	2-Chloroethyl vinyl ether	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	2-Chlorotoluene	0	ND	1	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	2-Hexanone	0	ND	20	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	4-Chlorotoluene	0	ND	1	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	4-Methyl-2-pentanone	0	ND	20	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Acetone	0	ND	50	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Benzene	0	ND	1	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Bromobenzene	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Bromochloromethane	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Bromodichloromethane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Bromoform	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Bromomethane	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Carbon disulfide	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Carbon tetrachloride	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Chlorobenzene	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Chloroethane	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Chloroform	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Chloromethane	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	cis-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	cis-1,3-Dichloropropene	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Dibromochloromethane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Dibromomethane	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Dichlorodifluoromethane	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Ethylbenzene	0	ND	1	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Hexachlorobutadiene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Isopropylbenzene	0	ND	2	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	m,p-Xylene (Sum of Isomers)	0	ND	1	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Methyl iodide	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Methyl-t-butyl ether	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Methylene chloride	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	n-Butylbenzene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	n-Propylbenzene	0	ND	5	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB030WA	9610049-01A			PRTB	SW8260A	Naphthalene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	o-Xylene	0	ND	1	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	p-Isopropyltoluene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	sec-Butylbenzene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Styrene	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	tert-Butylbenzene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Tetrachloroethene	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Toluene	0	ND	1	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	trans-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	trans-1,3-Dichloropropene	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	trans-1,4-Dichloro-2-butene	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Trichloroethene	0	ND	3	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Trichlorofluoromethane	0	ND	10	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Vinyl acetate	0	ND	5	UG/L		
96FWB030WA	9610049-01A			PRTB	SW8260A	Vinyl chloride	0	ND	2	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,1,1,2-Tetrachloroethane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,1,1-Trichloroethane	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,1,2,2-Tetrachloroethane	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,1,2-Trichloro-1,2,2-trifluoroethane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,1,2-Trichloroethane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,1-Dichloroethane	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,1-Dichloroethene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,1-Dichloropropene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2,3-Trichlorobenzene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2,3-Trichloropropane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2,4-Trichlorobenzene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2,4-Trimethylbenzene	27	=	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2-Dibromo-3-chloropropane	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2-Dibromoethane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2-Dichlorobenzene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2-Dichloroethane	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,2-Dichloropropane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,3,5-Trimethylbenzene	6.5	=	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,3-Dichlorobenzene	0	ND	2	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,3-Dichloropropane	0	ND	3	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	1,4-Dichlorobenzene	0	ND	2	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	2,2-Dichloropropane	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	2-Butanone	0	ND	50	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	2-Chloroethyl vinyl ether	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	2-Chlorotoluene	0	ND	1	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	2-Hexanone	0	ND	20	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	4-Chlorotoluene	0	ND	1	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	4-Methyl-2-pentanone	81	=	20	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Acetone	0	ND	50	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Benzene	0	ND	1	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Bromobenzene	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Bromochloromethane	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Bromodichloromethane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Bromoform	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Bromomethane	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Carbon disulfide	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Carbon tetrachloride	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Chlorobenzene	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Chloroethane	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Chloroform	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Chloromethane	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	cis-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	cis-1,3-Dichloropropene	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Dibromochloromethane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Dibromomethane	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Dichlorodifluoromethane	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Ethylbenzene	45	=	1	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Hexachlorobutadiene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Isopropylbenzene	0	ND	2	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	m,p-Xylene (Sum of Isomers)	350	=	1	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Methyl iodide	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Methyl-t-butyl ether	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Methylene chloride	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	n-Butylbenzene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	n-Propylbenzene	0	ND	5	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Naphthalene	3.8	=	5	UG/L	J	
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	o-Xylene	55	=	1	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	p-Isopropyltoluene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	sec-Butylbenzene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Styrene	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	tert-Butylbenzene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Tetrachloroethene	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Toluene	3.7	=	1	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	trans-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	trans-1,3-Dichloropropene	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	trans-1,4-Dichloro-2-butene	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Trichloroethene	0	ND	3	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Trichlorofluoromethane	0	ND	10	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Vinyl acetate	0	ND	5	UG/L		
96FWB032WA	9610049-02A	PS-9	20	PR	SW8260A	Vinyl chloride	0	ND	2	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	1,2,4-Trichlorobenzene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	1,2-Dichlorobenzene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	1,3-Dichlorobenzene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	1,4-Dichlorobenzene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2,4,5-Trichlorophenol	0	ND	50	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2,4,6-Trichlorophenol	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2,4-Dichlorophenol	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2,4-Dimethylphenol	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2,4-Dinitrophenol	0	ND	50	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2,4-Dinitrotoluene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2,6-Dinitrotoluene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2-Chloronaphthalene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2-Chlorophenol	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2-Methyl-4,6-dinitrophenol	0	ND	50	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2-Methylnaphthalene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2-Methylphenol (o-cresol)	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2-Nitroaniline	0	ND	50	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	2-Nitrophenol	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	3,3'-Dichlorobenzidine	0	ND	20	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	3-Nitroaniline	0	ND	50	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	4-Bromophenyl phenyl ether	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	4-Chloro-3-methyl phenol	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	4-Chloroaniline	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	4-Chlorophenyl phenyl ether	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	4-Methylphenol (p-cresol)	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	4-Nitroaniline	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	4-Nitrophenol	0	ND	50	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Acenaphthene	2.2	=	10	UG/L	J	
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Acenaphthylene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Anthracene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Benzo(a)anthracene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Benzo(a)pyrene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Benzo(b)fluoranthene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Benzo(g,h,i)perylene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Benzo(k)fluoranthene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Benzoic acid	0	ND	50	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Benzyl alcohol	0	ND	20	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Benzyl butyl phthalate	2.9	=	10	UG/L	J	B
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Bis(2-chloroethoxy)methane	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Bis(2-chloroethyl) ether	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Bis(2-chloroisopropyl)ether	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Bis(2-ethylhexyl) phthalate	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Chrysene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Di-n-butyl phthalate	1.7	=	10	UG/L	J	B
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Di-n-octyl phthalate	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Dibenzo(a,h)anthracene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Dibenzofuran	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Diethyl phthalate	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Dimethyl phthalate	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Fluoranthene	1.5	=	10	UG/L	J	
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Fluorene	1.5	=	10	UG/L	J	
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Hexachlorobenzene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Hexachlorobutadiene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Hexachlorocyclopentadiene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Hexachloroethane	0	ND	10	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
Airfield Pipeline Site

HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Indeno(1,2,3-cd)pyrene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Isophorone	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	N-Nitrosodi-n-propylamine	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	N-Nitrosodiphenylamine	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Naphthalene	2	=	10	UG/L	J	
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Nitrobenzene	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Pentachlorophenol	0	ND	50	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Phenanthrene	3.9	=	10	UG/L	J	
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Phenol	0	ND	10	UG/L		
96FWB032WA	9610049-02D	PS-9	20	PR	SW8270A	Pyrene	1.5	=	10	UG/L	J	
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,1,1,2-Tetrachloroethane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,1,1-Trichloroethane	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,1,2,2-Tetrachloroethane	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,1,2-Trichloro-1,2,2-trifluoroethane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,1,2-Trichloroethane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,1-Dichloroethane	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,1-Dichloroethene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,1-Dichloropropene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2,3-Trichlorobenzene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2,3-Trichloropropane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2,4-Trichlorobenzene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2,4-Trimethylbenzene	27	=	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2-Dibromo-3-chloropropane	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2-Dibromoethane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2-Dichlorobenzene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2-Dichloroethane	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,2-Dichloropropane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,3,5-Trimethylbenzene	6.9	=	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,3-Dichlorobenzene	0	ND	2	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,3-Dichloropropane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	1,4-Dichlorobenzene	0	ND	2	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	2,2-Dichloropropane	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	2-Butanone	0	ND	50	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	2-Chloroethyl vinyl ether	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	2-Chlorotoluene	0	ND	1	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
Airfield Pipeline Site

HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	2-Hexanone	0	ND	20	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	4-Chlorotoluene	0	ND	1	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	4-Methyl-2-pentanone	58	=	20	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Acetone	0	ND	50	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Benzene	0	ND	1	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Bromobenzene	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Bromochloromethane	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Bromodichloromethane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Bromoform	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Bromomethane	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Carbon disulfide	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Carbon tetrachloride	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Chlorobenzene	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Chloroethane	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Chloroform	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Chloromethane	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	cis-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	cis-1,3-Dichloropropene	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Dibromochloromethane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Dibromomethane	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Dichlorodifluoromethane	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Ethylbenzene	45	=	1	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Hexachlorobutadiene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Isopropylbenzene	2.4	=	2	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	m,p-Xylene (Sum of Isomers)	350	=	1	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Methyl iodide	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Methyl-t-butyl ether	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Methylene chloride	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	n-Butylbenzene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	n-Propylbenzene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Naphthalene	3.4	=	5	UG/L	J	
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	o-Xylene	49	=	1	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	p-Isopropyltoluene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	sec-Butylbenzene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Styrene	0	ND	3	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	tert-Butylbenzene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Tetrachloroethene	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Toluene	3	=	1	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	trans-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	trans-1,3-Dichloropropene	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	trans-1,4-Dichloro-2-butene	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Trichloroethene	0	ND	3	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Trichlorofluoromethane	0	ND	10	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Vinyl acetate	0	ND	5	UG/L		
96FWB033WA	9610049-03A	PS-9	20	QC	SW8260A	Vinyl chloride	0	ND	2	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	1,2,4-Trichlorobenzene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	1,2-Dichlorobenzene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	1,3-Dichlorobenzene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	1,4-Dichlorobenzene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2,4,5-Trichlorophenol	0	ND	50	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2,4,6-Trichlorophenol	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2,4-Dichlorophenol	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2,4-Dimethylphenol	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2,4-Dinitrophenol	0	ND	50	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2,4-Dinitrotoluene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2,6-Dinitrotoluene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2-Chloronaphthalene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2-Chlorophenol	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2-Methyl-4,6-dinitrophenol	0	ND	50	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2-Methylnaphthalene	1	=	10	UG/L	J	
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2-Methylphenol (o-cresol)	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2-Nitroaniline	0	ND	50	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	2-Nitrophenol	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	3,3'-Dichlorobenzidine	0	ND	20	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	3-Nitroaniline	0	ND	50	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	4-Bromophenyl phenyl ether	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	4-Chloro-3-methyl phenol	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	4-Chloroaniline	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	4-Chlorophenyl phenyl ether	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	4-Methylphenol (p-cresol)	0	ND	10	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	4-Nitroaniline	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	4-Nitrophenol	0	ND	50	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Acenaphthene	2.4	=	10	UG/L	J	
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Acenaphthylene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Anthracene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Benzo(a)anthracene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Benzo(a)pyrene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Benzo(b)fluoranthene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Benzo(g,h,i)perylene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Benzo(k)fluoranthene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Benzoic acid	0	ND	50	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Benzyl alcohol	0	ND	20	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Benzyl butyl phthalate	1.9	=	10	UG/L	J	B
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Bis(2-chloroethoxy)methane	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Bis(2-chloroethyl) ether	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Bis(2-chloroisopropyl)ether	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Bis(2-ethylhexyl) phthalate	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Chrysene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Di-n-butyl phthalate	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Di-n-octyl phthalate	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Dibenzo(a,h)anthracene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Dibenzofuran	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Diethyl phthalate	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Dimethyl phthalate	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Fluoranthene	2.3	=	10	UG/L	J	
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Fluorene	1.7	=	10	UG/L	J	
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Hexachlorobenzene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Hexachlorobutadiene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Hexachlorocyclopentadiene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Hexachloroethane	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Indeno(1,2,3-cd)pyrene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Isophorone	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	N-Nitrosodi-n-propylamine	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	N-Nitrosodiphenylamine	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Naphthalene	2.6	=	10	UG/L	J	

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Nitrobenzene	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Pentachlorophenol	0	ND	50	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Phenanthrene	4.6	=	10	UG/L	J	
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Phenol	0	ND	10	UG/L		
96FWB033WA	9610049-03D	PS-9	20	QC	SW8270A	Pyrene	2.2	=	10	UG/L	J	
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,1,1,2-Tetrachloroethane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,1,1-Trichloroethane	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,1,2,2-Tetrachloroethane	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,1,2-Trichloro-1,2,2-trifluoroethane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,1,2-Trichloroethane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,1-Dichloroethane	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,1-Dichloroethene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,1-Dichloropropene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2,3-Trichlorobenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2,3-Trichloropropane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2,4-Trichlorobenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2,4-Trimethylbenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2-Dibromo-3-chloropropane	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2-Dibromoethane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2-Dichlorobenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2-Dichloroethane	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,2-Dichloropropane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,3,5-Trimethylbenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,3-Dichlorobenzene	0	ND	2	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,3-Dichloropropane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	1,4-Dichlorobenzene	0	ND	2	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	2,2-Dichloropropane	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	2-Butanone	0	ND	50	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	2-Chloroethyl vinyl ether	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	2-Chlorotoluene	0	ND	1	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	2-Hexanone	0	ND	20	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	4-Chlorotoluene	0	ND	1	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	4-Methyl-2-pentanone	0	ND	20	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Acetone	0	ND	50	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Benzene	0	ND	1	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Bromobenzene	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Bromochloromethane	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Bromodichloromethane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Bromoform	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Bromomethane	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Carbon disulfide	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Carbon tetrachloride	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Chlorobenzene	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Chloroethane	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Chloroform	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Chloromethane	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	cis-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	cis-1,3-Dichloropropene	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Dibromochloromethane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Dibromomethane	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Dichlorodifluoromethane	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Ethylbenzene	0	ND	1	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Hexachlorobutadiene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Isopropylbenzene	0	ND	2	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	m,p-Xylene (Sum of Isomers)	0	ND	1	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Methyl iodide	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Methyl-t-butyl ether	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Methylene chloride	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	n-Butylbenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	n-Propylbenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Naphthalene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	o-Xylene	0	ND	1	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	p-Isopropyltoluene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	sec-Butylbenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Styrene	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	tert-Butylbenzene	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Tetrachloroethene	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Toluene	0	ND	1	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	trans-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	trans-1,3-Dichloropropene	0	ND	5	UG/L		

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Groundwater Probe Results
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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	trans-1,4-Dichloro-2-butene	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Trichloroethene	0	ND	3	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Trichlorofluoromethane	0	ND	10	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Vinyl acetate	0	ND	5	UG/L		
96FWB035WA	9610049-04A	PS-5	20	PR	SW8260A	Vinyl chloride	0	ND	2	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	1,2,4-Trichlorobenzene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	1,2-Dichlorobenzene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	1,3-Dichlorobenzene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	1,4-Dichlorobenzene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2,4,5-Trichlorophenol	0	ND	50	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2,4,6-Trichlorophenol	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2,4-Dichlorophenol	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2,4-Dimethylphenol	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2,4-Dinitrophenol	0	ND	50	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2,4-Dinitrotoluene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2,6-Dinitrotoluene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2-Chloronaphthalene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2-Chlorophenol	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2-Methyl-4,6-dinitrophenol	0	ND	50	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2-Methylnaphthalene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2-Methylphenol (o-cresol)	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2-Nitroaniline	0	ND	50	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	2-Nitrophenol	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	3,3'-Dichlorobenzidine	0	ND	20	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	3-Nitroaniline	0	ND	50	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	4-Bromophenyl phenyl ether	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	4-Chloro-3-methyl phenol	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	4-Chloroaniline	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	4-Chlorophenyl phenyl ether	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	4-Methylphenol (p-cresol)	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	4-Nitroaniline	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	4-Nitrophenol	0	ND	50	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Acenaphthene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Acenaphthylene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Anthracene	0	ND	10	UG/L		

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Groundwater Probe Results
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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Benzo(a)anthracene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Benzo(a)pyrene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Benzo(b)fluoranthene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Benzo(g,h,i)perylene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Benzo(k)fluoranthene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Benzoic acid	0	ND	50	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Benzyl alcohol	0	ND	20	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Benzyl butyl phthalate	1.4	=	10	UG/L	J	B
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Bis(2-chloroethoxy)methane	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Bis(2-chloroethyl) ether	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Bis(2-chloroisopropyl)ether	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Bis(2-ethylhexyl) phthalate	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Chrysene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Di-n-butyl phthalate	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Di-n-octyl phthalate	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Dibenzo(a,h)anthracene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Dibenzofuran	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Diethyl phthalate	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Dimethyl phthalate	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Fluoranthene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Fluorene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Hexachlorobenzene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Hexachlorobutadiene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Hexachlorocyclopentadiene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Hexachloroethane	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Indeno(1,2,3-cd)pyrene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Isophorone	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	N-Nitrosodi-n-propylamine	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	N-Nitrosodiphenylamine	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Naphthalene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Nitrobenzene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Pentachlorophenol	0	ND	50	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Phenanthrene	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Phenol	0	ND	10	UG/L		
96FWB035WA	9610049-04D	PS-5	20	PR	SW8270A	Pyrene	0	ND	10	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,1,1,2-Tetrachloroethane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,1,1-Trichloroethane	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,1,2,2-Tetrachloroethane	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,1,2-Trichloro-1,2,2-trifluoroethane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,1,2-Trichloroethane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,1-Dichloroethane	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,1-Dichloroethene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,1-Dichloropropene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2,3-Trichlorobenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2,3-Trichloropropane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2,4-Trichlorobenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2,4-Trimethylbenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2-Dibromo-3-chloropropane	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2-Dibromoethane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2-Dichlorobenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2-Dichloroethane	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,2-Dichloropropane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,3,5-Trimethylbenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,3-Dichlorobenzene	0	ND	2	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,3-Dichloropropane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	1,4-Dichlorobenzene	0	ND	2	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	2,2-Dichloropropane	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	2-Butanone	0	ND	50	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	2-Chloroethyl vinyl ether	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	2-Chlorotoluene	0	ND	1	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	2-Hexanone	0	ND	20	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	4-Chlorotoluene	0	ND	1	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	4-Methyl-2-pentanone	0	ND	20	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Acetone	0	ND	50	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Benzene	0	ND	1	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Bromobenzene	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Bromochloromethane	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Bromodichloromethane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Bromoform	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Bromomethane	0	ND	10	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Carbon disulfide	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Carbon tetrachloride	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Chlorobenzene	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Chloroethane	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Chloroform	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Chloromethane	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	cis-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	cis-1,3-Dichloropropene	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Dibromochloromethane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Dibromomethane	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Dichlorodifluoromethane	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Ethylbenzene	0	ND	1	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Hexachlorobutadiene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Isopropylbenzene	0	ND	2	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	m,p-Xylene (Sum of Isomers)	0	ND	1	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Methyl iodide	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Methyl-t-butyl ether	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Methylene chloride	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	n-Butylbenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	n-Propylbenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Naphthalene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	o-Xylene	0	ND	1	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	p-Isopropyltoluene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	sec-Butylbenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Styrene	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	tert-Butylbenzene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Tetrachloroethene	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Toluene	0	ND	1	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	trans-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	trans-1,3-Dichloropropene	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	trans-1,4-Dichloro-2-butene	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Trichloroethene	0	ND	3	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Trichlorofluoromethane	0	ND	10	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Vinyl acetate	0	ND	5	UG/L		
96FWB036WA	9610049-05A	PS-7	20	PR	SW8260A	Vinyl chloride	0	ND	2	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	1,2,4-Trichlorobenzene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	1,2-Dichlorobenzene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	1,3-Dichlorobenzene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	1,4-Dichlorobenzene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2,4,5-Trichlorophenol	0	ND	50	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2,4,6-Trichlorophenol	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2,4-Dichlorophenol	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2,4-Dimethylphenol	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2,4-Dinitrophenol	0	ND	50	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2,4-Dinitrotoluene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2,6-Dinitrotoluene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2-Chloronaphthalene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2-Chlorophenol	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2-Methyl-4,6-dinitrophenol	0	ND	50	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2-Methylnaphthalene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2-Methylphenol (o-cresol)	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2-Nitroaniline	0	ND	50	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	2-Nitrophenol	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	3,3'-Dichlorobenzidine	0	ND	20	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	3-Nitroaniline	0	ND	50	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	4-Bromophenyl phenyl ether	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	4-Chloro-3-methyl phenol	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	4-Chloroaniline	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	4-Chlorophenyl phenyl ether	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	4-Methylphenol (p-cresol)	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	4-Nitroaniline	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	4-Nitrophenol	0	ND	50	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Acenaphthene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Acenaphthylene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Anthracene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Benzo(a)anthracene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Benzo(a)pyrene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Benzo(b)fluoranthene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Benzo(g,h,i)perylene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Benzo(k)fluoranthene	0	ND	10	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Benzoic acid	0	ND	50	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Benzyl alcohol	0	ND	20	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Benzyl butyl phthalate	1	=	10	UG/L	J	B
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Bis(2-chloroethoxy)methane	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Bis(2-chloroethyl) ether	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Bis(2-chloroisopropyl)ether	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Bis(2-ethylhexyl) phthalate	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Chrysene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Di-n-butyl phthalate	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Di-n-octyl phthalate	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Dibenzo(a,h)anthracene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Dibenzofuran	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Diethyl phthalate	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Dimethyl phthalate	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Fluoranthene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Fluorene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Hexachlorobenzene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Hexachlorobutadiene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Hexachlorocyclopentadiene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Hexachloroethane	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Indeno(1,2,3-cd)pyrene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Isophorone	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	N-Nitrosodi-n-propylamine	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	N-Nitrosodiphenylamine	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Naphthalene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Nitrobenzene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Pentachlorophenol	0	ND	50	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Phenanthrene	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Phenol	0	ND	10	UG/L		
96FWB036WA	9610049-05D	PS-7	20	PR	SW8270A	Pyrene	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,1,1,2-Tetrachloroethane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,1,1-Trichloroethane	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,1,2,2-Tetrachloroethane	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,1,2-Trichloro-1,2,2-trifluoroethane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,1,2-Trichloroethane	0	ND	3	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,1-Dichloroethane	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,1-Dichloroethene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,1-Dichloropropene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2,3-Trichlorobenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2,3-Trichloropropane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2,4-Trichlorobenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2,4-Trimethylbenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2-Dibromo-3-chloropropane	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2-Dibromoethane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2-Dichlorobenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2-Dichloroethane	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,2-Dichloropropane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,3,5-Trimethylbenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,3-Dichlorobenzene	0	ND	2	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,3-Dichloropropane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	1,4-Dichlorobenzene	0	ND	2	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	2,2-Dichloropropane	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	2-Butanone	0	ND	50	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	2-Chloroethyl vinyl ether	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	2-Chlorotoluene	0	ND	1	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	2-Hexanone	0	ND	20	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	4-Chlorotoluene	0	ND	1	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	4-Methyl-2-pentanone	0	ND	20	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Acetone	0	ND	50	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Benzene	0	ND	1	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Bromobenzene	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Bromochloromethane	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Bromodichloromethane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Bromoform	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Bromomethane	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Carbon disulfide	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Carbon tetrachloride	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Chlorobenzene	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Chloroethane	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Chloroform	0	ND	3	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Chloromethane	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	cis-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	cis-1,3-Dichloropropene	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Dibromochloromethane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Dibromomethane	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Dichlorodifluoromethane	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Ethylbenzene	0	ND	1	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Hexachlorobutadiene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Isopropylbenzene	0	ND	2	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	m,p-Xylene (Sum of Isomers)	0	ND	1	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Methyl iodide	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Methyl-t-butyl ether	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Methylene chloride	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	n-Butylbenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	n-Propylbenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Naphthalene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	o-Xylene	0	ND	1	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	p-Isopropyltoluene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	sec-Butylbenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Styrene	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	tert-Butylbenzene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Tetrachloroethene	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Toluene	0	ND	1	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	trans-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	trans-1,3-Dichloropropene	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	trans-1,4-Dichloro-2-butene	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Trichloroethene	0	ND	3	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Trichlorofluoromethane	0	ND	10	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Vinyl acetate	0	ND	5	UG/L		
96FWB037WA	9610049-06A	PS-10	20	PR	SW8260A	Vinyl chloride	0	ND	2	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	1,2,4-Trichlorobenzene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	1,2-Dichlorobenzene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	1,3-Dichlorobenzene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	1,4-Dichlorobenzene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2,4,5-Trichlorophenol	0	ND	50	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2,4,6-Trichlorophenol	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2,4-Dichlorophenol	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2,4-Dimethylphenol	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2,4-Dinitrophenol	0	ND	50	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2,4-Dinitrotoluene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2,6-Dinitrotoluene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2-Chloronaphthalene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2-Chlorophenol	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2-Methyl-4,6-dinitrophenol	0	ND	50	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2-Methylnaphthalene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2-Methylphenol (o-cresol)	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2-Nitroaniline	0	ND	50	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	2-Nitrophenol	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	3,3'-Dichlorobenzidine	0	ND	20	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	3-Nitroaniline	0	ND	50	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	4-Bromophenyl phenyl ether	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	4-Chloro-3-methyl phenol	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	4-Chloroaniline	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	4-Chlorophenyl phenyl ether	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	4-Methylphenol (p-cresol)	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	4-Nitroaniline	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	4-Nitrophenol	0	ND	50	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Acenaphthene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Acenaphthylene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Anthracene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Benzo(a)anthracene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Benzo(a)pyrene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Benzo(b)fluoranthene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Benzo(g,h,i)perylene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Benzo(k)fluoranthene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Benzoic acid	0	ND	50	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Benzyl alcohol	0	ND	20	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Benzyl butyl phthalate	3.1	=	10	UG/L	J	B
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Bis(2-chloroethoxy)methane	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Bis(2-chloroethyl) ether	0	ND	10	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Bis(2-chloroisopropyl)ether	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Bis(2-ethylhexyl) phthalate	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Chrysene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Di-n-butyl phthalate	1.2	=	10	UG/L	J	B
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Di-n-octyl phthalate	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Dibenzo(a,h)anthracene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Dibenzofuran	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Diethyl phthalate	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Dimethyl phthalate	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Fluoranthene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Fluorene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Hexachlorobenzene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Hexachlorobutadiene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Hexachlorocyclopentadiene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Hexachloroethane	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Indeno(1,2,3-cd)pyrene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Isophorone	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	N-Nitrosodi-n-propylamine	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	N-Nitrosodiphenylamine	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Naphthalene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Nitrobenzene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Pentachlorophenol	0	ND	50	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Phenanthrene	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Phenol	0	ND	10	UG/L		
96FWB037WA	9610049-06D	PS-10	20	PR	SW8270A	Pyrene	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,1,1,2-Tetrachloroethane	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,1,1-Trichloroethane	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,1,2,2-Tetrachloroethane	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,1,2-Trichloro-1,2,2-trifluoroethane	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,1,2-Trichloroethane	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,1-Dichloroethane	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,1-Dichloroethene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,1-Dichloropropene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2,3-Trichlorobenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2,3-Trichloropropane	0	ND	3	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2,4-Trichlorobenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2,4-Trimethylbenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2-Dibromo-3-chloropropane	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2-Dibromoethane	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2-Dichlorobenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2-Dichloroethane	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,2-Dichloropropane	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,3,5-Trimethylbenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,3-Dichlorobenzene	0	ND	2	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,3-Dichloropropane	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	1,4-Dichlorobenzene	0	ND	2	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	2,2-Dichloropropane	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	2-Butanone	0	ND	50	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	2-Chloroethyl vinyl ether	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	2-Chlorotoluene	0	ND	1	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	2-Hexanone	0	ND	20	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	4-Chlorotoluene	0	ND	1	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	4-Methyl-2-pentanone	0	ND	20	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Acetone	0	ND	50	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Benzene	0	ND	1	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Bromobenzene	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Bromochloromethane	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Bromodichloromethane	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Bromoform	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Bromomethane	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Carbon disulfide	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Carbon tetrachloride	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Chlorobenzene	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Chloroethane	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Chloroform	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Chloromethane	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	cis-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	cis-1,3-Dichloropropene	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Dibromochloromethane	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Dibromomethane	0	ND	3	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Dichlorodifluoromethane	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Ethylbenzene	0	ND	1	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Hexachlorobutadiene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Isopropylbenzene	0	ND	2	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	m,p-Xylene (Sum of Isomers)	0	ND	1	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Methyl iodide	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Methyl-t-butyl ether	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Methylene chloride	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	n-Butylbenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	n-Propylbenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Naphthalene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	o-Xylene	0	ND	1	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	p-Isopropyltoluene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	sec-Butylbenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Styrene	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	tert-Butylbenzene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Tetrachloroethene	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Toluene	0	ND	1	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	trans-1,2-Dichloroethene	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	trans-1,3-Dichloropropene	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	trans-1,4-Dichloro-2-butene	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Trichloroethene	0	ND	3	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Trichlorofluoromethane	0	ND	10	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Vinyl acetate	0	ND	5	UG/L		
96FWB038WA	9610049-07A	PS-12	20	PR	SW8260A	Vinyl chloride	0	ND	2	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	1,2,4-Trichlorobenzene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	1,2-Dichlorobenzene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	1,3-Dichlorobenzene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	1,4-Dichlorobenzene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2,4,5-Trichlorophenol	0	ND	50	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2,4,6-Trichlorophenol	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2,4-Dichlorophenol	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2,4-Dimethylphenol	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2,4-Dinitrophenol	0	ND	50	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2,4-Dinitrotoluene	0	ND	10	UG/L		

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HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2,6-Dinitrotoluene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2-Chloronaphthalene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2-Chlorophenol	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2-Methyl-4,6-dinitrophenol	0	ND	50	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2-Methylnaphthalene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2-Methylphenol (o-cresol)	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2-Nitroaniline	0	ND	50	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	2-Nitrophenol	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	3,3'-Dichlorobenzidine	0	ND	20	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	3-Nitroaniline	0	ND	50	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	4-Bromophenyl phenyl ether	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	4-Chloro-3-methyl phenol	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	4-Chloroaniline	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	4-Chlorophenyl phenyl ether	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	4-Methylphenol (p-cresol)	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	4-Nitroaniline	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	4-Nitrophenol	0	ND	50	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Acenaphthene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Acenaphthylene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Anthracene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Benzo(a)anthracene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Benzo(a)pyrene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Benzo(b)fluoranthene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Benzo(g,h,i)perylene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Benzo(k)fluoranthene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Benzoic acid	0	ND	50	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Benzyl alcohol	0	ND	20	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Benzyl butyl phthalate	1.3	=	10	UG/L	J	B
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Bis(2-chloroethoxy)methane	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Bis(2-chloroethyl) ether	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Bis(2-chloroisopropyl)ether	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Bis(2-ethylhexyl) phthalate	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Chrysene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Di-n-butyl phthalate	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Di-n-octyl phthalate	0	ND	10	UG/L		

Addendum to Operable Unit 5 Remedial Investigation Report
Groundwater Probe Results
Airfield Pipeline Site

HLA Sample Number	Lab Sample Number	Probe Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifiers
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Dibenzo(a,h)anthracene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Dibenzofuran	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Diethyl phthalate	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Dimethyl phthalate	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Fluoranthene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Fluorene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Hexachlorobenzene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Hexachlorobutadiene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Hexachlorocyclopentadiene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Hexachloroethane	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Indeno(1,2,3-cd)pyrene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Isophorone	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	N-Nitrosodi-n-propylamine	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	N-Nitrosodiphenylamine	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Naphthalene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Nitrobenzene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Pentachlorophenol	0	ND	50	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Phenanthrene	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Phenol	0	ND	10	UG/L		
96FWB038WA	9610049-07D	PS-12	20	PR	SW8270A	Pyrene	0	ND	10	UG/L		

=	Analyte detected
ND	Not detected at or above the method reporting limit
PR	Project sample
PRTB	Project trip blank sample
QC	Quality control sample
UG/L	Micrograms per liter

B	Analyte deteceted in the blank and the sample
J	Estimated value

Addendum to Operable Unit 5 Remedial Investigation Report
Sediment Sample Results
Apple Street Site

HLA Sample Number	Lab Sample Number	Location Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note
96FWB028SD	A609090-01A	B028	0.5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	4	MG/KG	
96FWB028SD	A609090-01B	B028	0.5	PR	AK102	Diesel Range Organics (C10 - C28)	45	=	6.7	MG/KG	
96FWB028SD	A609090-01A	B028	0.5	PR	SW8020	Benzene	0	ND	0.04	MG/KG	
96FWB028SD	A609090-01A	B028	0.5	PR	SW8020	Ethylbenzene	0	ND	0.04	MG/KG	
96FWB028SD	A609090-01A	B028	0.5	PR	SW8020	Toluene	0	ND	0.04	MG/KG	
96FWB028SD	A609090-01A	B028	0.5	PR	SW8020	Xylenes	0	ND	0.04	MG/KG	
96FWB029SD	A609090-02A	B029	0.5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	3.8	MG/KG	
96FWB029SD	A609090-02B	B029	0.5	PR	AK102	Diesel Range Organics (C10 - C28)	41	=	6.6	MG/KG	
96FWB029SD	A609090-02A	B029	0.5	PR	SW8020	Benzene	0	ND	0.038	MG/KG	
96FWB029SD	A609090-02A	B029	0.5	PR	SW8020	Ethylbenzene	0	ND	0.038	MG/KG	
96FWB029SD	A609090-02A	B029	0.5	PR	SW8020	Toluene	0	ND	0.038	MG/KG	
96FWB029SD	A609090-02A	B029	0.5	PR	SW8020	Xylenes	0	ND	0.038	MG/KG	
96FWB030SD	A609090-03A	B030	1	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	4.2	MG/KG	
96FWB030SD	A609090-03B	B030	1	PR	AK102	Diesel Range Organics (C10 - C28)	41	=	6.7	MG/KG	
96FWB030SD	A609090-03A	B030	1	PR	SW8020	Benzene	0	ND	0.042	MG/KG	
96FWB030SD	A609090-03A	B030	1	PR	SW8020	Ethylbenzene	0	ND	0.042	MG/KG	
96FWB030SD	A609090-03A	B030	1	PR	SW8020	Toluene	0	ND	0.042	MG/KG	
96FWB030SD	A609090-03A	B030	1	PR	SW8020	Xylenes	0	ND	0.042	MG/KG	
96FWB031SD	A609090-04A	B032	0.5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.7	MG/KG	
96FWB031SD	A609090-04B	B032	0.5	PR	AK102	Diesel Range Organics (C10 - C28)	29	=	4.7	MG/KG	
96FWB031SD	A609090-04A	B032	0.5	PR	SW8020	Benzene	0	ND	0.027	MG/KG	
96FWB031SD	A609090-04A	B032	0.5	PR	SW8020	Ethylbenzene	0	ND	0.027	MG/KG	
96FWB031SD	A609090-04A	B032	0.5	PR	SW8020	Toluene	0	ND	0.027	MG/KG	
96FWB031SD	A609090-04A	B032	0.5	PR	SW8020	Xylenes	0	ND	0.027	MG/KG	
96FWB032SD	A609090-05A	B031	0.5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	3.5	MG/KG	
96FWB032SD	A609090-05B	B031	0.5	PR	AK102	Diesel Range Organics (C10 - C28)	51	=	5.9	MG/KG	
96FWB032SD	A609090-05A	B031	0.5	PR	SW8020	Benzene	0	ND	0.035	MG/KG	
96FWB032SD	A609090-05A	B031	0.5	PR	SW8020	Ethylbenzene	0	ND	0.035	MG/KG	
96FWB032SD	A609090-05A	B031	0.5	PR	SW8020	Toluene	0	ND	0.035	MG/KG	
96FWB032SD	A609090-05A	B031	0.5	PR	SW8020	Xylenes	0	ND	0.035	MG/KG	
96FWB033SD	A609090-06A	B031	0.5	QC	AK101	Gasoline Range Organics (C6 - C10)	0	ND	3.5	MG/KG	
96FWB033SD	A609090-06B	B031	0.5	QC	AK102	Diesel Range Organics (C10 - C28)	50	=	6.1	MG/KG	

Addendum to Operable Unit 5 Remedial Investigation Report
Sediment Sample Results
Apple Street Site

HLA Sample Number	Lab Sample Number	Location Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note
96FWB033SD	A609090-06A	B031	0.5	QC	SW8020	Benzene	0	ND	0.035	MG/KG	
96FWB033SD	A609090-06A	B031	0.5	QC	SW8020	Ethylbenzene	0	ND	0.035	MG/KG	
96FWB033SD	A609090-06A	B031	0.5	QC	SW8020	Toluene	0	ND	0.035	MG/KG	
96FWB033SD	A609090-06A	B031	0.5	QC	SW8020	Xylenes	0	ND	0.035	MG/KG	

=	Analyte detected
MG/KG	Milligrams per kilogram
ND	Not detected at or above the method reporting limit
PR	Project sample
QC	Quality control sample

Addendum to Operable Unit 5 Remedial Investigation Report
Soil Borings Results
Apple Street Site

HLA Sample Number	Lab Sample Number	Location Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifier
96FWB001SL	A609069-01A	AP-7245	5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.9	MG/KG		
96FWB001SL	A609069-01A	AP-7245	5	PR	SW8020	Benzene	0	ND	0.029	MG/KG		
96FWB001SL	A609069-01A	AP-7245	5	PR	SW8020	Ethylbenzene	0	ND	0.029	MG/KG		
96FWB001SL	A609069-01A	AP-7245	5	PR	SW8020	Toluene	0	ND	0.029	MG/KG		
96FWB001SL	A609069-01A	AP-7245	5	PR	SW8020	Xylenes	0	ND	0.029	MG/KG		
96FWB001SL	A609069-01B	AP-7245	5	PR	AK102	Diesel Range Organics (C10 - C28)	55	=	4.6	MG/KG		J
96FWB002SL	A609069-02A	AP-7245	10	PR	AK101	Gasoline Range Organics (C6 - C10)	3100	=	280	MG/KG		
96FWB002SL	A609069-02A	AP-7245	10	PR	SW8020	Benzene	0	ND	2.8	MG/KG		
96FWB002SL	A609069-02A	AP-7245	10	PR	SW8020	Ethylbenzene	0	ND	2.8	MG/KG		
96FWB002SL	A609069-02A	AP-7245	10	PR	SW8020	Toluene	0	ND	2.8	MG/KG		
96FWB002SL	A609069-02A	AP-7245	10	PR	SW8020	Xylenes	0	ND	2.8	MG/KG		
96FWB002SL	A609069-02B	AP-7245	10	PR	AK102	Diesel Range Organics (C10 - C28)	7500	=	96	MG/KG		J
96FWB003SL	A609069-03A	AP-7245	15	PR	AK101	Gasoline Range Organics (C6 - C10)	2400	=	260	MG/KG		
96FWB003SL	A609069-03A	AP-7245	15	PR	SW8020	Benzene	0	ND	2.6	MG/KG		
96FWB003SL	A609069-03A	AP-7245	15	PR	SW8020	Ethylbenzene	0	ND	2.6	MG/KG		
96FWB003SL	A609069-03A	AP-7245	15	PR	SW8020	Toluene	0	ND	2.6	MG/KG		
96FWB003SL	A609069-03A	AP-7245	15	PR	SW8020	Xylenes	0	ND	2.6	MG/KG		
96FWB003SL	A609069-03B	AP-7245	15	PR	AK102	Diesel Range Organics (C10 - C28)	4.2	=	4.2	MG/KG		J
96FWB004SL	A609069-04A	AP-7245	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.7	MG/KG		
96FWB004SL	A609069-04A	AP-7245	20	PR	SW8020	Benzene	0	ND	0.027	MG/KG		
96FWB004SL	A609069-04A	AP-7245	20	PR	SW8020	Ethylbenzene	0	ND	0.027	MG/KG		
96FWB004SL	A609069-04A	AP-7245	20	PR	SW8020	Toluene	0	ND	0.027	MG/KG		
96FWB004SL	A609069-04A	AP-7245	20	PR	SW8020	Xylenes	0	ND	0.027	MG/KG		
96FWB004SL	A609069-04B	AP-7245	20	PR	AK102	Diesel Range Organics (C10 - C28)	2400	=	45	MG/KG		J
96FWB005SL	A609073-01A	AP-7246	5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	3.3	MG/KG		
96FWB005SL	A609073-01A	AP-7246	5	PR	SW8020	Benzene	0	ND	0.033	MG/KG		
96FWB005SL	A609073-01A	AP-7246	5	PR	SW8020	Ethylbenzene	0	ND	0.033	MG/KG		
96FWB005SL	A609073-01A	AP-7246	5	PR	SW8020	Toluene	0	ND	0.033	MG/KG		
96FWB005SL	A609073-01A	AP-7246	5	PR	SW8020	Xylenes	0	ND	0.033	MG/KG		
96FWB005SL	A609073-01B	AP-7246	5	PR	AK102	Diesel Range Organics (C10 - C28)	73	=	5.4	MG/KG		
96FWB006SL	A609073-02A	AP-7246	10	PR	AK101	Gasoline Range Organics (C6 - C10)	1500	=	88	MG/KG		
96FWB006SL	A609073-02A	AP-7246	10	PR	SW8020	Benzene	0	ND	0.88	MG/KG		
96FWB006SL	A609073-02A	AP-7246	10	PR	SW8020	Ethylbenzene	0	ND	0.88	MG/KG		
96FWB006SL	A609073-02A	AP-7246	10	PR	SW8020	Toluene	0	ND	0.88	MG/KG		
96FWB006SL	A609073-02A	AP-7246	10	PR	SW8020	Xylenes	0	ND	0.88	MG/KG		
96FWB006SL	A609073-02B	AP-7246	10	PR	AK102	Diesel Range Organics (C10 - C28)	8800	=	71	MG/KG		

Addendum to Operable Unit 5 Remedial Investigation Report
Soil Borings Results
Apple Street Site

HLA Sample Number	Lab Sample Number	Location Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifier
96FWB007SL	A609073-03A	AP-7246	10	QC	AK101	Gasoline Range Organics (C6 - C10)	1900	=	180	MG/KG		
96FWB007SL	A609073-03A	AP-7246	10	QC	SW8020	Benzene	0	ND	1.8	MG/KG		
96FWB007SL	A609073-03A	AP-7246	10	QC	SW8020	Ethylbenzene	0	ND	1.8	MG/KG		
96FWB007SL	A609073-03A	AP-7246	10	QC	SW8020	Toluene	0	ND	1.8	MG/KG		
96FWB007SL	A609073-03A	AP-7246	10	QC	SW8020	Xylenes	0	ND	1.8	MG/KG		
96FWB007SL	A609073-03B	AP-7246	10	QC	AK102	Diesel Range Organics (C10 - C28)	23000	=	120	MG/KG		
96FWB009SL	A609073-04A	AP-7246	15	PR	AK101	Gasoline Range Organics (C6 - C10)	1700	=	110	MG/KG		
96FWB009SL	A609073-04A	AP-7246	15	PR	SW8020	Benzene	0	ND	1.1	MG/KG		
96FWB009SL	A609073-04A	AP-7246	15	PR	SW8020	Ethylbenzene	0	ND	1.1	MG/KG		
96FWB009SL	A609073-04A	AP-7246	15	PR	SW8020	Toluene	0	ND	1.1	MG/KG		
96FWB009SL	A609073-04A	AP-7246	15	PR	SW8020	Xylenes	0	ND	1.1	MG/KG		
96FWB009SL	A609073-04B	AP-7246	15	PR	AK102	Diesel Range Organics (C10 - C28)	2200	=	45	MG/KG		
96FWB010SL	A609073-05A	AP-7246	20	PR	AK101	Gasoline Range Organics (C6 - C10)	51	=	2.6	MG/KG		
96FWB010SL	A609073-05A	AP-7246	20	PR	SW8020	Benzene	0	ND	0.026	MG/KG		
96FWB010SL	A609073-05A	AP-7246	20	PR	SW8020	Ethylbenzene	0	ND	0.026	MG/KG		
96FWB010SL	A609073-05A	AP-7246	20	PR	SW8020	Toluene	0	ND	0.026	MG/KG		
96FWB010SL	A609073-05A	AP-7246	20	PR	SW8020	Xylenes	0	ND	0.026	MG/KG		
96FWB010SL	A609073-05B	AP-7246	20	PR	AK102	Diesel Range Organics (C10 - C28)	30	=	4.3	MG/KG		
96FWB011SL	A609073-06A	AP-7247	6	PR	AK101	Gasoline Range Organics (C6 - C10)	3.8	=	2.7	MG/KG		
96FWB011SL	A609073-06A	AP-7247	6	PR	SW8020	Benzene	0	ND	0.027	MG/KG		
96FWB011SL	A609073-06A	AP-7247	6	PR	SW8020	Ethylbenzene	0	ND	0.027	MG/KG		
96FWB011SL	A609073-06A	AP-7247	6	PR	SW8020	Toluene	0	ND	0.027	MG/KG		
96FWB011SL	A609073-06A	AP-7247	6	PR	SW8020	Xylenes	0	ND	0.027	MG/KG		
96FWB011SL	A609073-06B	AP-7247	6	PR	AK102	Diesel Range Organics (C10 - C28)	11	=	4.3	MG/KG		
96FWB012SL	A609073-07A	AP-7247	10	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	5.3	MG/KG		
96FWB012SL	A609073-07A	AP-7247	10	PR	SW8020	Benzene	0	ND	0.053	MG/KG		
96FWB012SL	A609073-07A	AP-7247	10	PR	SW8020	Ethylbenzene	0	ND	0.053	MG/KG		
96FWB012SL	A609073-07A	AP-7247	10	PR	SW8020	Toluene	0	ND	0.053	MG/KG		
96FWB012SL	A609073-07A	AP-7247	10	PR	SW8020	Xylenes	0	ND	0.053	MG/KG		
96FWB012SL	A609073-07B	AP-7247	10	PR	AK102	Diesel Range Organics (C10 - C28)	980	=	8.9	MG/KG		
96FWB013SL	A609073-08A	AP-7247	15	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.8	MG/KG		
96FWB013SL	A609073-08A	AP-7247	15	PR	SW8020	Benzene	0	ND	0.028	MG/KG		
96FWB013SL	A609073-08A	AP-7247	15	PR	SW8020	Ethylbenzene	0	ND	0.028	MG/KG		
96FWB013SL	A609073-08A	AP-7247	15	PR	SW8020	Toluene	0	ND	0.028	MG/KG		
96FWB013SL	A609073-08A	AP-7247	15	PR	SW8020	Xylenes	0	ND	0.028	MG/KG		
96FWB013SL	A609073-08B	AP-7247	15	PR	AK102	Diesel Range Organics (C10 - C28)	170	=	4.9	MG/KG		

Addendum to Operable Unit 5 Remedial Investigation Report
Soil Borings Results
Apple Street Site

HLA Sample Number	Lab Sample Number	Location Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifier
96FWB014SL	A609073-09A	AP-7247	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.8	MG/KG		
96FWB014SL	A609073-09A	AP-7247	20	PR	SW8020	Benzene	0	ND	0.028	MG/KG		
96FWB014SL	A609073-09A	AP-7247	20	PR	SW8020	Ethylbenzene	0	ND	0.028	MG/KG		
96FWB014SL	A609073-09A	AP-7247	20	PR	SW8020	Toluene	0	ND	0.028	MG/KG		
96FWB014SL	A609073-09A	AP-7247	20	PR	SW8020	Xylenes	0	ND	0.028	MG/KG		
96FWB014SL	A609073-09B	AP-7247	20	PR	AK102	Diesel Range Organics (C10 - C28)	92	=	4.6	MG/KG		
96FWB015SL	A609073-10A	AP-7248	5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	3.8	MG/KG		
96FWB015SL	A609073-10A	AP-7248	5	PR	SW8020	Benzene	0	ND	0.038	MG/KG		
96FWB015SL	A609073-10A	AP-7248	5	PR	SW8020	Ethylbenzene	0	ND	0.038	MG/KG		
96FWB015SL	A609073-10A	AP-7248	5	PR	SW8020	Toluene	0	ND	0.038	MG/KG		
96FWB015SL	A609073-10A	AP-7248	5	PR	SW8020	Xylenes	0	ND	0.038	MG/KG		
96FWB015SL	A609073-10B	AP-7248	5	PR	AK102	Diesel Range Organics (C10 - C28)	300	=	6	MG/KG		
96FWB016SL	A609073-11A	AP-7248	10	PR	AK101	Gasoline Range Organics (C6 - C10)	13	=	2.6	MG/KG		
96FWB016SL	A609073-11A	AP-7248	10	PR	SW8020	Benzene	0	ND	0.026	MG/KG		
96FWB016SL	A609073-11A	AP-7248	10	PR	SW8020	Ethylbenzene	0	ND	0.026	MG/KG		
96FWB016SL	A609073-11A	AP-7248	10	PR	SW8020	Toluene	0	ND	0.026	MG/KG		
96FWB016SL	A609073-11A	AP-7248	10	PR	SW8020	Xylenes	0	ND	0.026	MG/KG		
96FWB016SL	A609073-11B	AP-7248	10	PR	AK102	Diesel Range Organics (C10 - C28)	33	=	4.2	MG/KG		
96FWB017SL	A609073-12A	AP-7248	10	QC	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.4	MG/KG		
96FWB017SL	A609073-12A	AP-7248	10	QC	SW8020	Benzene	0	ND	0.024	MG/KG		
96FWB017SL	A609073-12A	AP-7248	10	QC	SW8020	Ethylbenzene	0	ND	0.024	MG/KG		
96FWB017SL	A609073-12A	AP-7248	10	QC	SW8020	Toluene	0	ND	0.024	MG/KG		
96FWB017SL	A609073-12A	AP-7248	10	QC	SW8020	Xylenes	0	ND	0.024	MG/KG		
96FWB017SL	A609073-12B	AP-7248	10	QC	AK102	Diesel Range Organics (C10 - C28)	25	=	4.2	MG/KG		
96FWB019SL	A609073-13A	AP-7248	15	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.5	MG/KG		
96FWB019SL	A609073-13A	AP-7248	15	PR	SW8020	Benzene	0	ND	0.025	MG/KG		
96FWB019SL	A609073-13A	AP-7248	15	PR	SW8020	Ethylbenzene	0	ND	0.025	MG/KG		
96FWB019SL	A609073-13A	AP-7248	15	PR	SW8020	Toluene	0	ND	0.025	MG/KG		
96FWB019SL	A609073-13A	AP-7248	15	PR	SW8020	Xylenes	0	ND	0.025	MG/KG		
96FWB019SL	A609073-13B	AP-7248	15	PR	AK102	Diesel Range Organics (C10 - C28)	0	ND	4	MG/KG		
96FWB020SL	A609073-14A	AP-7248	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.9	MG/KG		
96FWB020SL	A609073-14A	AP-7248	20	PR	SW8020	Benzene	0	ND	0.029	MG/KG		
96FWB020SL	A609073-14A	AP-7248	20	PR	SW8020	Ethylbenzene	0	ND	0.029	MG/KG		
96FWB020SL	A609073-14A	AP-7248	20	PR	SW8020	Toluene	0	ND	0.029	MG/KG		
96FWB020SL	A609073-14A	AP-7248	20	PR	SW8020	Xylenes	0	ND	0.029	MG/KG		
96FWB020SL	A609073-14B	AP-7248	20	PR	AK102	Diesel Range Organics (C10 - C28)	0	ND	5	MG/KG		

Addendum to Operable Unit 5 Remedial Investigation Report
Soil Borings Results
Apple Street Site

HLA Sample Number	Lab Sample Number	Location Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifier
96FWB021SL	A609081-01A	AP-7249	5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.5	MG/KG		
96FWB021SL	A609081-01A	AP-7249	5	PR	SW8020	Benzene	0	ND	0.025	MG/KG		
96FWB021SL	A609081-01A	AP-7249	5	PR	SW8020	Ethylbenzene	0	ND	0.025	MG/KG		
96FWB021SL	A609081-01A	AP-7249	5	PR	SW8020	Toluene	0	ND	0.025	MG/KG		
96FWB021SL	A609081-01A	AP-7249	5	PR	SW8020	Xylenes	0	ND	0.025	MG/KG		
96FWB021SL	A609081-01B	AP-7249	5	PR	AK102	Diesel Range Organics (C10 - C28)	100	=	4.2	MG/KG		J
96FWB022SL	A609081-02A	AP-7249	10	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	3.3	MG/KG		
96FWB022SL	A609081-02A	AP-7249	10	PR	SW8020	Benzene	0	ND	0.033	MG/KG		
96FWB022SL	A609081-02A	AP-7249	10	PR	SW8020	Ethylbenzene	0	ND	0.033	MG/KG		
96FWB022SL	A609081-02A	AP-7249	10	PR	SW8020	Toluene	0	ND	0.033	MG/KG		
96FWB022SL	A609081-02A	AP-7249	10	PR	SW8020	Xylenes	0	ND	0.033	MG/KG		
96FWB022SL	A609081-02B	AP-7249	10	PR	AK102	Diesel Range Organics (C10 - C28)	21	=	5.5	MG/KG		J
96FWB023SL	A609081-03A	AP-7249	15	PR	AK101	Gasoline Range Organics (C6 - C10)	1200	=	260	MG/KG		
96FWB023SL	A609081-03A	AP-7249	15	PR	SW8020	Benzene	0	ND	2.6	MG/KG		
96FWB023SL	A609081-03A	AP-7249	15	PR	SW8020	Ethylbenzene	0	ND	2.6	MG/KG		
96FWB023SL	A609081-03A	AP-7249	15	PR	SW8020	Toluene	0	ND	2.6	MG/KG		
96FWB023SL	A609081-03A	AP-7249	15	PR	SW8020	Xylenes	0	ND	2.6	MG/KG		
96FWB023SL	A609081-03B	AP-7249	15	PR	AK102	Diesel Range Organics (C10 - C28)	60	=	4.3	MG/KG		J
96FWB024SL	A609081-04A	AP-7249	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.7	MG/KG		
96FWB024SL	A609081-04A	AP-7249	20	PR	SW8020	Benzene	0	ND	0.027	MG/KG		
96FWB024SL	A609081-04A	AP-7249	20	PR	SW8020	Ethylbenzene	0	ND	0.027	MG/KG		
96FWB024SL	A609081-04A	AP-7249	20	PR	SW8020	Toluene	0	ND	0.027	MG/KG		
96FWB024SL	A609081-04A	AP-7249	20	PR	SW8020	Xylenes	0	ND	0.027	MG/KG		
96FWB024SL	A609081-04B	AP-7249	20	PR	AK102	Diesel Range Organics (C10 - C28)	0	ND	4.5	MG/KG		
96FWB025SL	A609081-05A	AP-7250	5	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.8	MG/KG		
96FWB025SL	A609081-05A	AP-7250	5	PR	SW8020	Benzene	0	ND	0.028	MG/KG		
96FWB025SL	A609081-05A	AP-7250	5	PR	SW8020	Ethylbenzene	0	ND	0.028	MG/KG		
96FWB025SL	A609081-05A	AP-7250	5	PR	SW8020	Toluene	0	ND	0.028	MG/KG		
96FWB025SL	A609081-05A	AP-7250	5	PR	SW8020	Xylenes	0	ND	0.028	MG/KG		
96FWB025SL	A609081-05B	AP-7250	5	PR	AK102	Diesel Range Organics (C10 - C28)	16	=	4.7	MG/KG		J
96FWB026SL	A609081-06A	AP-7250	10	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	4.1	MG/KG		
96FWB026SL	A609081-06A	AP-7250	10	PR	SW8020	Benzene	0	ND	0.041	MG/KG		
96FWB026SL	A609081-06A	AP-7250	10	PR	SW8020	Ethylbenzene	0	ND	0.041	MG/KG		
96FWB026SL	A609081-06A	AP-7250	10	PR	SW8020	Toluene	0	ND	0.041	MG/KG		
96FWB026SL	A609081-06A	AP-7250	10	PR	SW8020	Xylenes	0	ND	0.041	MG/KG		
96FWB026SL	A609081-06B	AP-7250	10	PR	AK102	Diesel Range Organics (C10 - C28)	120	=	6.6	MG/KG		J

Addendum to Operable Unit 5 Remedial Investigation Report
Soil Borings Results
Apple Street Site

HLA Sample Number	Lab Sample Number	Location Number	Sample Depth (feet)	Sample Type	Analytical Method	Analyte	Result	Result Qualifier	Reporting Detection Limit	Units	Laboratory Note	CQAR Qualifier
96FWB027SL	A609081-07A	AP-7250	15	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	2.6	MG/KG		
96FWB027SL	A609081-07A	AP-7250	15	PR	SW8020	Benzene	0	ND	0.026	MG/KG		
96FWB027SL	A609081-07A	AP-7250	15	PR	SW8020	Ethylbenzene	0	ND	0.026	MG/KG		
96FWB027SL	A609081-07A	AP-7250	15	PR	SW8020	Toluene	0	ND	0.026	MG/KG		
96FWB027SL	A609081-07A	AP-7250	15	PR	SW8020	Xylenes	0	ND	0.026	MG/KG		
96FWB027SL	A609081-07B	AP-7250	15	PR	AK102	Diesel Range Organics (C10 - C28)	0	ND	4.4	MG/KG		
96FWB028SL	A609081-08A	AP-7250	20	PR	AK101	Gasoline Range Organics (C6 - C10)	0	ND	3	MG/KG		
96FWB028SL	A609081-08A	AP-7250	20	PR	SW8020	Benzene	0	ND	0.03	MG/KG		
96FWB028SL	A609081-08A	AP-7250	20	PR	SW8020	Ethylbenzene	0	ND	0.03	MG/KG		
96FWB028SL	A609081-08A	AP-7250	20	PR	SW8020	Toluene	0	ND	0.03	MG/KG		
96FWB028SL	A609081-08A	AP-7250	20	PR	SW8020	Xylenes	0	ND	0.03	MG/KG		
96FWB028SL	A609081-08B	AP-7250	20	PR	AK102	Diesel Range Organics (C10 - C28)	6.4	=	4.8	MG/KG		J

=	Analyte detected
MG/KG	Milligrams per kilogram
ND	Not detected at or above the method reporting limit
PR	Project sample
QC	Quality control sample
J	Estimated value

DISTRIBUTION

Operable Unit 5
Data Gaps Investigation Report
Fort Wainwright, Alaska

June 19, 1997

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Quality Control Reviewer

Sandra E. Draper, P.E.
Civil Engineer - 9360

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